1997

Revised

EV1™

Electrical

Service Manual

CamScanner

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CAUTION

To reduce the chance of personal injury and/or property damage, the following instructions must be carefully observed.

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of all motor vehicles. If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended and described in this service manual are effective methods of performing service and repair. Some of these procedures require the use of tools specifically designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure, or tool that is not recommended by the vehicle manufacturer must first determine that neither his safety nor the safe operation of the vehicle will be jeopardized by the replacement part, service procedure, or tool selected.

It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive; it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

This vehicle has a high voltage power system. Disabling the system is required when working on or around the high voltage system and high voltage battery pack (other than testing the system using the procedures in this manual).

To help avoid severe shocks and burns and vehicle damage, always follow the cautions in this manual to disable the high voltage system. See the high voltage disable and enable procedure in the front of this service manual.

This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to "CAUTIONS" under "On-Vehicle Service" and the SIR Component and Wiring Location views in the "SIR Service Manual" before performing service on or around SIR components or wiring. Failure to follow "CAUTIONS" could result in possible air bag deployment, personal injury, otherwise unneeded SIR system repairs.

To help avoid accidental air bag deployment and personal injury, when servicing a vehicle that requires repair of the SIR system and another vehicle system, it is recommended that the SIR be repaired first using service manual procedures.

CAUTION

Saturn Service Manuals are intended for use by professional, qualified technicians. Attempting repairs or service without the appropriate training, tools, and equipment could cause injury to you or others and damage to your vehicle that may cause it not to operate.

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NOTICE

Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application.

The applicable service procedure will identify, where necessary, those fasteners that must be replaced after removal; or those fasteners that require thread lockers or thread sealant.

UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener.

When you install fasteners, use the correct tightening sequence and specifications.

Following these instructions can help you avoid damage to parts and systems.

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NOTES

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GLOSSARY OF ACRONYMS

Acronym	Definition
ABS	Anti-Lock Braking System
AC	Alternating Current
AM	Amplitude Modulation
Amp	Ampere
APM	Accessory AC and DC Power Control Module. With PIM, makes up PEB
APS	Auxiliary Power Supply (part of APM)
BCA	Bias Control Assembly
BPM	Battery Pack Module
BRS	Battery Reserve Switch
BTCM	Brake/Torque Control Module
BTSI	Brake Transmission Shift Interlock (GM)
CD	Compact Disc
cfm	Cubic Feet per Minute
cg	Center of Gravity
CHMSL	Center High-Mount Stop Lamp
CMC	Compressor Motor Controller (part of APM)
CPA	Connector – Positive Assurance
CR	Charge Receptacle
CRFM	Condenser Radiator Fan Module (part of HPVS)
CTPS	Check Tire Pressure System
DC	Direct Current
DLC	Data Link Connector
DERM	Diagnostic and Energy Reserve Module (SIR control module)
DIA	Dealer Installed Accessory
DM	Drive Motor
DRL	Daytime Running Light
E/M	English/Metric
EHPS	Electro-Hydraulic Power Steering
EKP	External Keypad
EMB	Electro-Magnetic Brake (part of ABS)
EMI	Electromagnetic Interference
EPS	Electric Power Steering. Also see EHPS

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GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
EEPROM	Electronically Erasable Programmable Read Only Memory
ETS	Electronic Traction System
EV	Electric Vehicle
EVO	Electronic Variable Orifice
FLIP	Forward Lamp – Instrument Panel Harness. Name of major EV low voltage wire harness
FM	Frequency Modulation
FOD	Front of Dash
g	Gram
GFI	Ground Fault Interrupt
GVMR	Gross Vehicle Mass Rating
GVW	Gross Vehicle Weight
HPVM	Heat Pump Ventilation Module
HPVS	Heat Pump Ventilation System. Similar to HVAC on ICE vehicles
HTCM	HPVS/Thermal Control Module
HV	High Voltage
HVAC	Heating, Ventilating, and Air Conditioning (on ICE vehicles. For EV, see HPVS).
HWS	Heated Windshield
HWS	Hand Wheel Sensor
Hz	Hertz (cycles per second)
IC	Integrated Circuits
ICE	Internal Combustion Engine
IGBT	Isolated Gate Bipolar Transistor
I/O	Input(s)/Output(s)
IP	Instrument Panel
ISRV	Inside Rear View (mirror)
JB	Junction Block
KAM	Keep Alive Memory
kg	Kilogram
km	Kilometer
km/h	Kilometers per hour

GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
kPa	Kilo Pascals
kW	Kilowatt
kWh	Kilowatt–hour
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Left Front
LH	Left Hand
LHD	Left Hand Drive
LHJB	Left Hand Junction Block
LR	Left Rear
LVW	Loaded Vehicle Weight
m	Meter
MMC	Metal Matrix Composite (rear brake drum material)
MHz	Megahertz
mi	Mile(s)
MPH	Miles Per Hour
MSRP	Manufacturers Suggested Retail Price (includes dealer preparation)
MUX	Multiplex or Multiplexer
N	Newton(s)
NTF	No Trouble Found. Reported failure does not reoccur under test
OEM	Original Equipment Manufacturer
OSRV	Outside Rear View (mirror)
PCM	Propulsion Control Module
PDT	Portable Diagnostic Tool
PEB	Power Electronics Bay
PIM	Power Inverter Module
POA	Part of Assembly
PPS	Pedal Position Sensor
PRND	Park–Reverse–Neutral–Drive, as in PRND Selector
PROM	Programmable Read Only Memory
PSOC	Pack State of Charge
PTC	Positive Thermal Coefficient. Term for resistive heating module

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GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
EEPROM	Electronically Erasable Programmable Read Only Memory
ETS	Electronic Traction System
EV	Electric Vehicle
EVO	Electronic Variable Orifice
FLIP	Forward Lamp – Instrument Panel Harness. Name of major EV low voltage wire harness
FM	Frequency Modulation
FOD	Front of Dash
g	Gram
GFI	Ground Fault Interrupt
GVMR	Gross Vehicle Mass Rating
GVW	Gross Vehicle Weight
HPVM	Heat Pump Ventilation Module
HPVS	Heat Pump Ventilation System. Similar to HVAC on ICE vehicles
HTCM	HPVS/Thermal Control Module
HV	High Voltage
HVAC	Heating, Ventilating, and Air Conditioning (on ICE vehicles. For EV, see HPVS).
HWS	Heated Windshield
HWS	Hand Wheel Sensor
Hz	Hertz (cycles per second)
IC	Integrated Circuits
ICE	Internal Combustion Engine
IGBT	Isolated Gate Bipolar Transistor
I/O	Input(s)/Output(s)
IP	Instrument Panel
ISRV	Inside Rear View (mirror)
JB	Junction Block
KAM	Keep Alive Memory
kg	Kilogram
km	Kilometer
km/h	Kilometers per hour

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GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
kPa	Kilo Pascals
kW	Kilowatt
kWh	Kilowatt–hour
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Left Front
LH	Left Hand
LHD	Left Hand Drive
LHJB	Left Hand Junction Block
LR	Left Rear
LVW	Loaded Vehicle Weight
m	Meter
MMC	Metal Matrix Composite (rear brake drum material)
MHz	Megahertz
mi	Mile(s)
MPH	Miles Per Hour
MSRP	Manufacturers Suggested Retail Price (includes dealer preparation)
MUX	Multiplex or Multiplexer
N	Newton(s)
NTF	No Trouble Found. Reported failure does not reoccur under test
OEM	Original Equipment Manufacturer
OSRV	Outside Rear View (mirror)
PCM	Propulsion Control Module
PDT	Portable Diagnostic Tool
PEB	Power Electronics Bay
PIM	Power Inverter Module
POA	Part of Assembly
PPS	Pedal Position Sensor
PRND	Park–Reverse–Neutral–Drive, as in PRND Selector
PROM	Programmable Read Only Memory
PSOC	Pack State of Charge
PTC	Positive Thermal Coefficient. Term for resistive heating module

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GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
PWM	Pulse Width Modulation, or Pulse Width Modulated
QDM	Quad Driver Module
RAM	Random Access Memory
RAP	Retained Accessory Power
RF	Right Front
RF	Radio Frequency
RH	Right Hand
RHJB	Right Hand Junction Block
RMS	Root-Mean-Squared
ROM	Read Only Memory
RP	Reduced Performance
RPM	Revolutions Per Minute
RR	Right Rear
RSA	Run/Lock Shifter Assembly
SAE	Society of Automotive Engineers
SDL	Serial Data Link
SDM	Sensor Diagnostic Module
SIR	Supplemental Inflatable Restraint (air bag) system
SLA	Short-Long Control Arm (suspension system)
SOC	State of Charge (battery pack). Usually expressed as a percentage
SN	Service Now
SSPO	Saturn Service Parts Operation
SS	Service Soon
SWA	Steering Wheel Angle
TNF	Trouble – Not Found. Reported failure reoccurs but cause cannot be determined
TJB	Trunk Junction Block
TOD	Time of Day
TPA	Terminal – Positive Assurance
T/S	Turn Signal
TT	Telltale

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GLOSSARY OF ACRONYMS CONTINUED

Acronym	Definition
UART	Universal Asynchronous Receiver – Transmitter (communications IC)
UH	Under Hood
ULEV	Ultra-Low Emissions Vehicle
USOC	User State Of Charge
V5B	5 Volt Supply
VAC	Voltage, Alternating Current
VF	Vacuum Fluorescence
VH	Vehicle Handling
VIN	Vehicle Identification Number
VTD	Vehicle Theft Deterrent
W	Watt
WSS	Wheel Speed Sensor (part of ABS)
WSW	Windshield Washer/Wiper
ZEV	Zero Emission Vehicle

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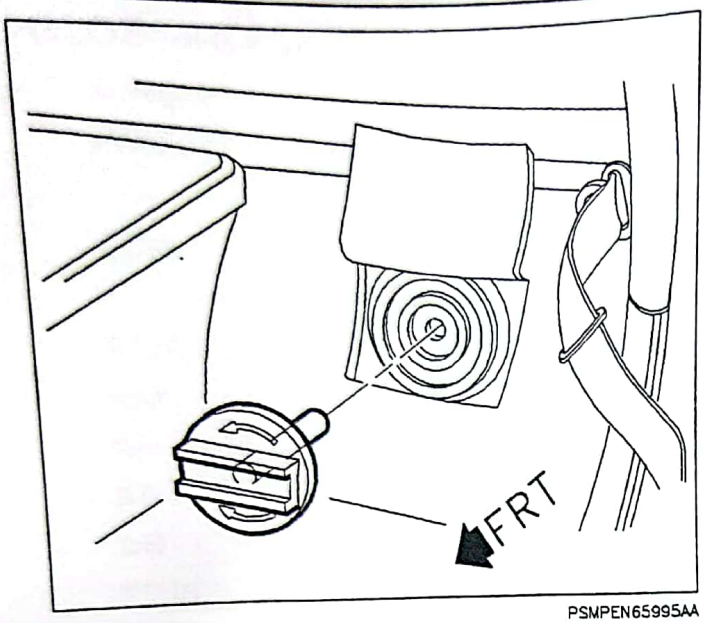


PSMPEN65995AA

HIGH VOLTAGE DISABLE

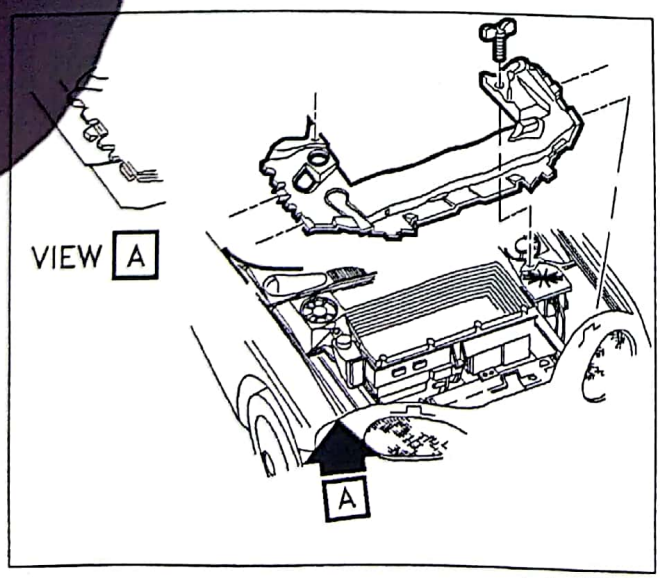
REMOVAL

CAUTION: TO REDUCE THE RISK OF SEVERE SHOCKS AND BURNS, THE HIGH VOLTAGE SYSTEM SHOULD BE DISABLED ANY TIME SERVICE WORK IS BEING PERFORMED ON OR AROUND THE HIGH VOLTAGE SYSTEM. WHEN IN DOUBT, ALWAYS DISABLE THE HIGH VOLTAGE SYSTEM. THE 12 VOLT SYSTEM WILL STILL BE ACTIVE AFTER THE HIGH VOLTAGE SYSTEM HAS BEEN DISABLED.

1. Place the vehicle in the "RUN" mode.
2. Remove the manual disconnect knob.
   a. Tilt the drivers seat forward.
   b. Raise the carpet flap, located on the battery tunnel behind the drivers seat.
   c. Turn the manual disconnect knob counterclockwise and pull the manual disconnect knob straight out.

IMPORTANT: An audible click should be heard when turning the manual disconnect knob. This click indicates the automatic disconnect relays have opened.

3. Verify high voltage has been removed.
   a. Connect scan tool to the data link connector (DLC) and run the High Voltage special test. Battery pack module (BPM) diagnostic trouble codes (DTCs) 312, 280 and/or 275 should be present, which indicates BPM and auto disconnect recognized a high voltage disconnect.
   b. If test fails, refer to service manual "High Voltage Special Test Failed" in the "Battery and Charging System Service Manual."
4. Remove engine compartment sight shield.



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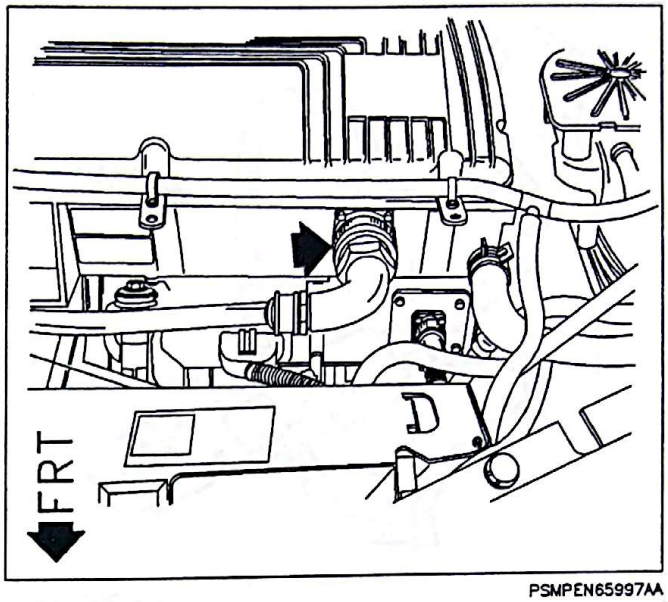
CAUTION: TO REDUCE THE RISK OF SEVERE SHOCKS AND BURNS, ALWAYS ASSUME THE HIGH VOLTAGE IS PRESENT WHEN DISCONNECTING THE CHARGE RECEPTACLE TO PIM CONNECTOR. DO NOT ALLOW THE CONNECTOR BODY TO TOUCH THE PINS OF THE PIM WHEN REMOVING THE CONNECTOR.

5. Remove the charge receptacle to power inverter module (PIM) cannon connector using one hand.



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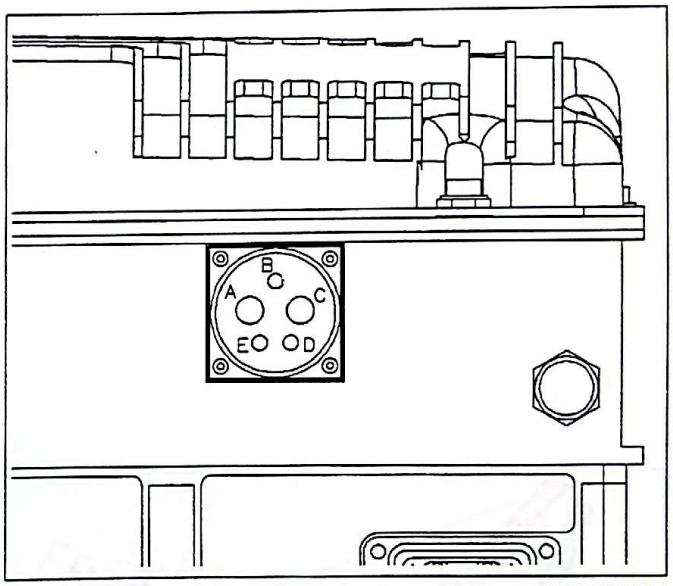
6. Using a DVOM and only one hand, measure from pin A of the PIM to chassis ground and from pin C of the PIM to chassis ground and from pin A to C. All measurements should be less than 10 volts. Pin C and Pin A are the large high voltage pins on the PIM.
   a. If the voltage is less than 10 volts, high voltage system is disabled.
   b. If the voltage is greater than 10 volts, refer to the "High Voltage" section in the "Battery and Charging Service Manual."



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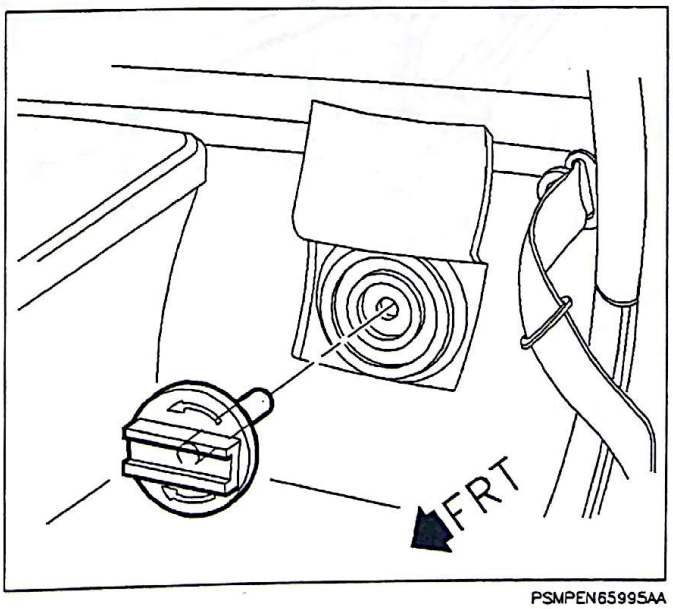
HIGH VOLTAGE ENABLE

INSTALLATION

1. Install charge receptacle to PIM cannon connector.
2. Install engine compartment sight shield.
3. Tilt driver's seat forward.
4. Raise the carpet flap, located on the battery tunnel behind the driver's seat.
5. Install the manual disconnect knob by pushing the shaft straight into the hole and turning clockwise.
6. Clear all DTCs using the scan tool.



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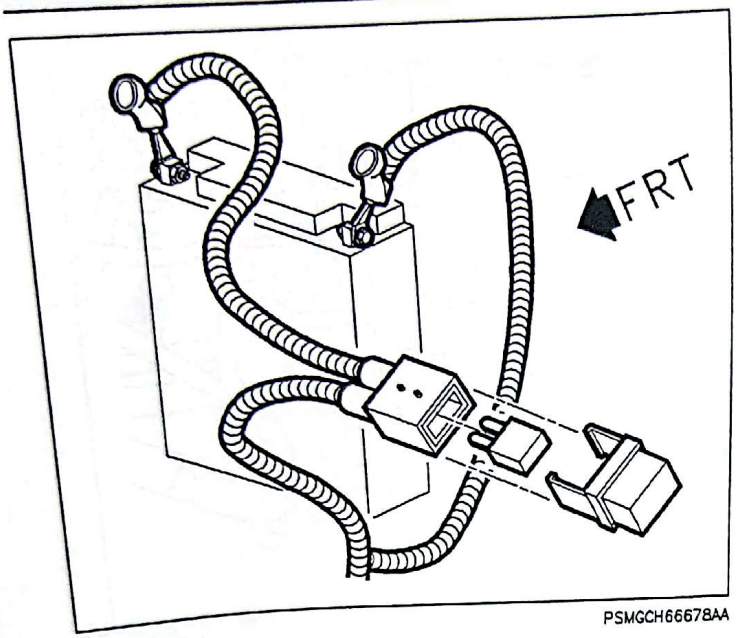

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12 VOLT SYSTEM DISABLE

CAUTION: DISABLE THE 12 VOLT ELECTRICAL SYSTEM TO HELP AVOID PERSONAL INJURY OR POSSIBLE DAMAGE.

IMPORTANT: The key pad must be in the LOCK mode for two minutes prior to performing the following step. Failure to do so could result in the loss of memory that retains the battery pack state of charge. If this occurs refer to "Battery Pack and Charging System" service manual for details.

1. Remove the cover on the 60 amp maxi fuse holder located in the negative auxiliary battery cable.
2. Remove the 60 amp maxi fuse.

12 VOLT SYSTEM ENABLE

1. Install 60 amp maxi fuse located on the negative auxiliary battery cable
2. Place cover on maxi fuse holder.

SIR SYSTEM

ON VEHICLE SERVICE

SERVICE PRECAUTIONS

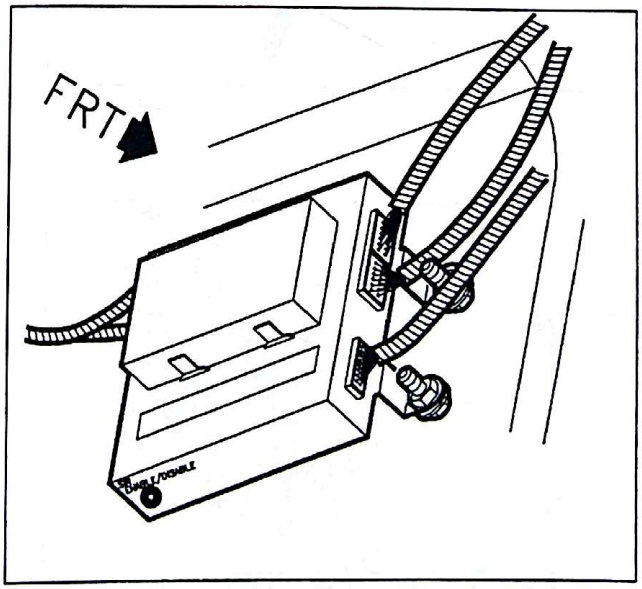
CAUTION: WHEN PERFORMING SERVICE ON OR AROUND SIR COMPONENTS OR SIR WIRING FOLLOW THE PROCEDURE BELOW TO TEMPORARILY DISABLE THE SIR SYSTEM. FAILURE TO FOLLOW PROCEDURES COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY OR OTHERWISE UNNEEDED SIR SYSTEM REPAIRS.

THE SENSING AND DIAGNOSTIC MODULE (SDM) CAN MAINTAIN SUFFICIENT VOLTAGE TO CAUSE A DEPLOYMENT FOR UP TO *10 MINUTES* AFTER THE KEY PAD HAS BEEN PLACED IN THE "LOCK" MODE, ALSO IF THE AUXILIARY BATTERY IS DISCONNECTED OR THE SIR "ENABLE/DISABLE" SWITCH IS PLACED IN THE DISABLE POSITION. MANY OF THE SERVICE PROCEDURES REQUIRE THE SIR "ENABLE/DISABLE" SWITCH TO BE PLACED IN THE "DISABLE" POSITION AND DISCONNECTION OF THE DEPLOYMENT LOOPS TO AVOID AN ACCIDENTAL DEPLOYMENT.

DISABLING THE SIR SYSTEM

1. Turn the steering wheel so that the vehicle's wheels are pointing straight ahead.
2. Place the key pad in the **LOCK** mode.
3. Place the SIR **"ENABLE/DISABLE"** switch in the right hand junction block in the **DISABLE** position.

IMPORTANT: With the SIR **ENABLE/DISABLE** switch in the **DISABLE** position and the key pad in the RUN mode, the AIR BAG telltale lamp will be "On." This is normal operation and does not indicate an SIR system malfunction.



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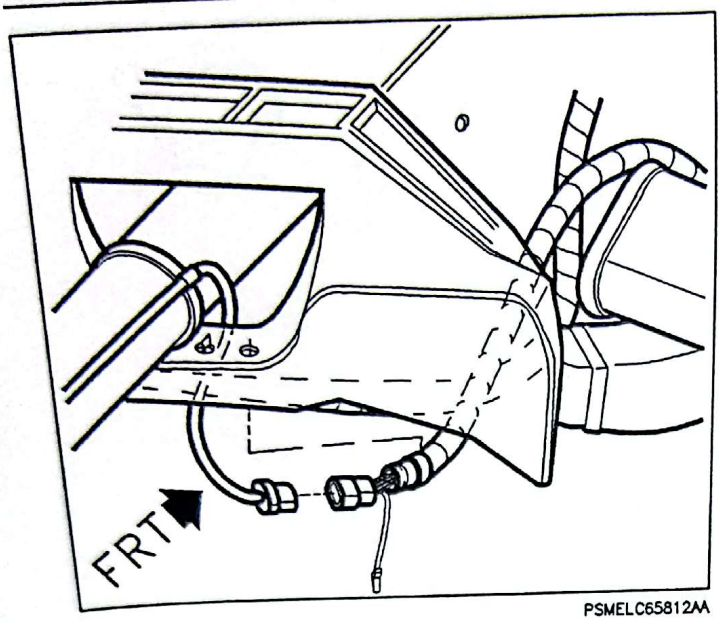

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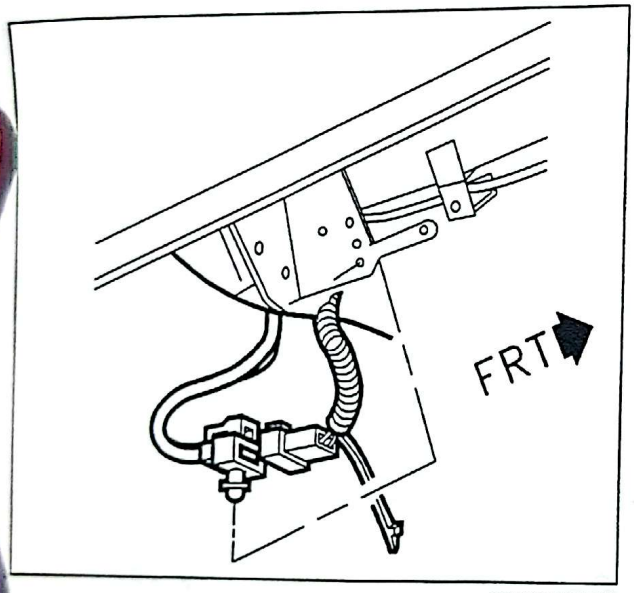
4. Remove connector position assurance (CPA) device and disconnect yellow two-way connector located near the base of the steering column.



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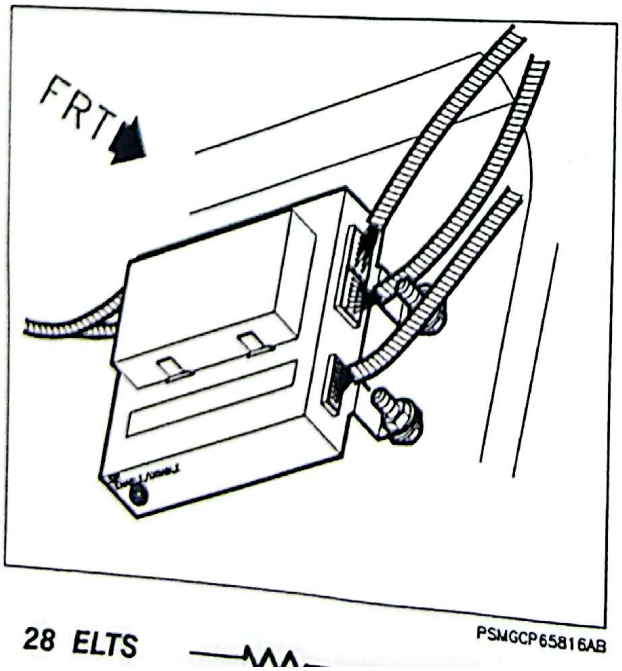
5. Remove connector position assurance (CPA) device and disconnect yellow two-way connector located on passenger inflator module pigtail under RH side of I/P.



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ENABLING THE SIR SYSTEM

1. Place key pad in the **LOCK** mode.
2. Connect yellow two-way SIR connector at the base of steering column and install connector position assurance (CPA) device to connector.
3. Connect yellow two-way passenger inflator module pigtail and install connector position assurance (CPA) to connector.
4. Place SIR **ENABLE/DISABLE** switch to the **ENABLE** position, located in the RH junction block.
5. Place key pad in the "RUN" mode and verify that the AIR BAG telltale lamp flashes seven times as the key pad is placed in the "RUN" mode and then goes Off. If lamp does not operate as described above perform the "SIR Diagnostic System Check" in this manual.

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LIFTING, JACKING, AND SUPPORT POINTS

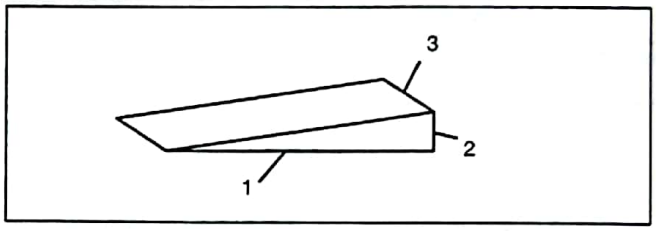
CAUTION: TO HELP AVOID PERSONAL INJURY WHEN A VEHICLE IS ON A HOIST, PROVIDE ADDITIONAL SUPPORT FOR THE VEHICLE. THIS WILL REDUCE THE POSSIBILITY OF THE VEHICLE FALLING OFF THE HOIST.

CAUTION: TO HELP AVOID PERSONAL INJURY, ALWAYS USE JACK STANDS WHEN WORKING ON OR UNDER ANY VEHICLE THAT IS SUPPORTED ONLY BY A FLOOR JACK OR A HOIST.

NOTICE: When lifting with a frame contact hoist, and battery pack removal is not necessary, lift the vehicle on the body side frame-lower pinch weld flanges at specific lift locations. (Location views on next page).

NOTICE: Because of the uniqueness of the design of the EV1 and its ground clearance, it is necessary to follow the hoisting directions very carefully. With an inground two post front and rear hoist, it may be necessary to use either low profile arms or ramps as needed in the front lift pad area to keep the fascia from being damaged when approaching or leaving the hoisting area. Ramp size needed:

1. **1050 mm in length (41-3/8 in.)**
2. **155 mm in height (6-7/64 in.)**
3. **230 mm in width (9-1/16 in.)**



NOTICE: When lifting with a suspension contact hoist, position the front hoist lift pads under the lower control arms. Lift from under the rear tires for rear suspension. (Refer to "Hoisting/Lifting for a Two Post In Ground Hoist Front and Rear" in this section for more information and illustrations.)

When battery pack removal is required, the use of two rear lift pad adaptors must be used. These lift pad adaptors are obtainable from:

General Motors Dealer Equipment
Telephone: 1-800–GM–TOOLS

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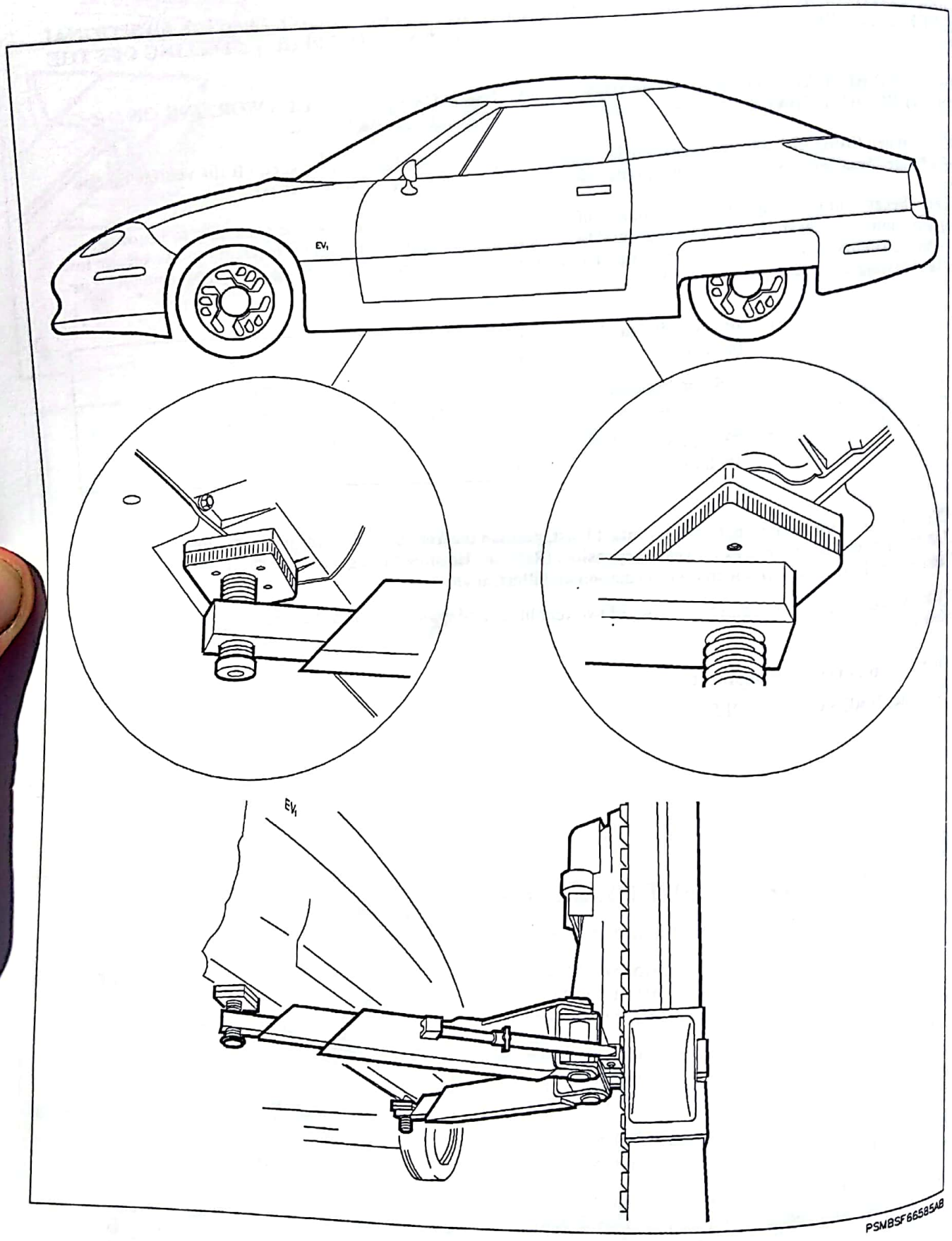
GENERAL INFORMATION

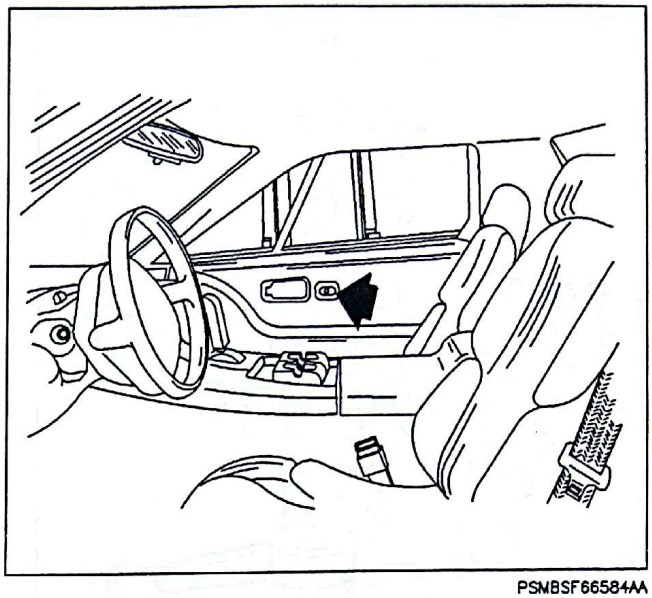


HOISTING/LIFTING FOR A 2 POST ABOVE GROUND HOIST - (SIDE CAR)

CAUTION: TO HELP AVOID PERSONAL INJURY, ALWAYS USE JACK STANDS WHEN WORKING ON OR UNDER ANY VEHICLE THAT IS LIFTED ONLY BY A FLOOR JACK OR A HOIST.

CAUTION: BEFORE ENTERING THE AREA UNDER A RAISED VEHICLE ALWAYS CHECK TO MAKE SURE HOIST SAFETY MECHANISMS ARE ENGAGED OR LIFT SAFETY STANDS ARE IN PLACE.

1. Position the vehicle in the hoisting area centering the vehicle between the towers. To center the vehicle to the hoist in its fore aft position, use the door lock switch on the door trim pad as a reference.



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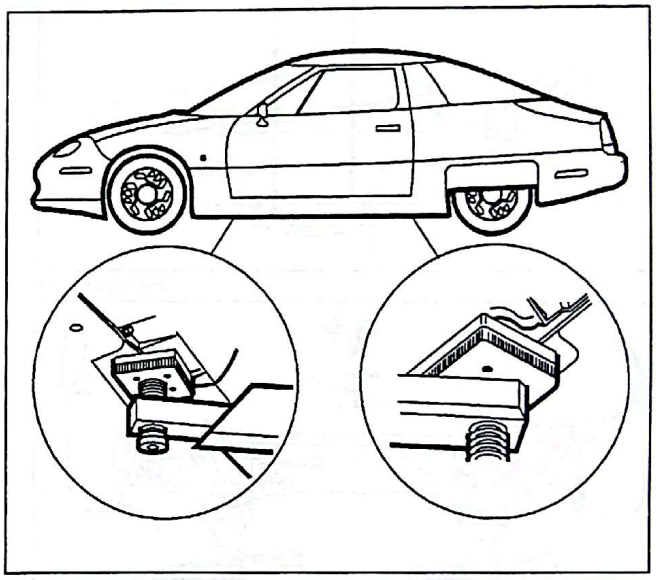
2. Move lift arms under the vehicle and adjust the pads to the bottom of the pinch weld flange at specified lift locations.



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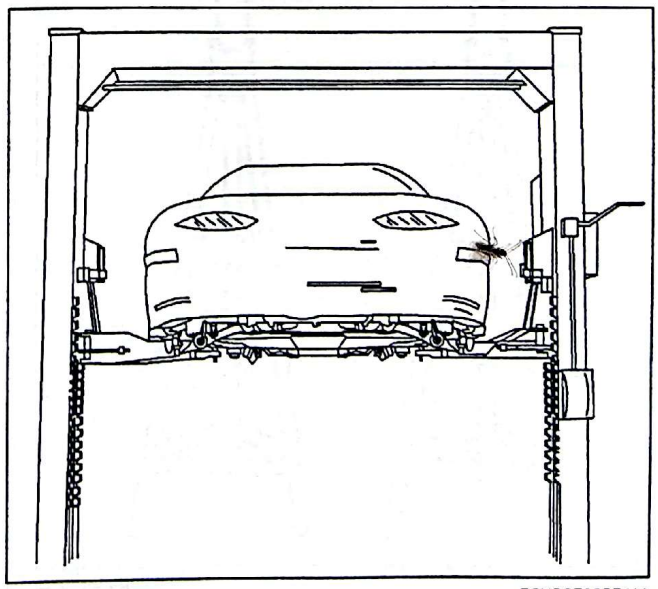
3. Raise the vehicle to the required working height



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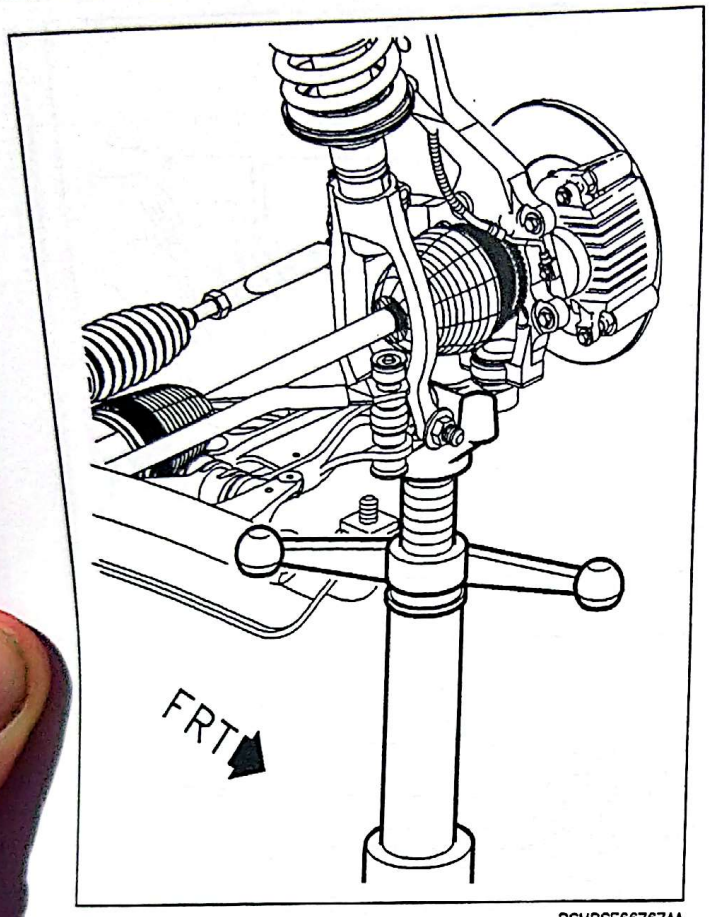
4. Position safety stands in place.



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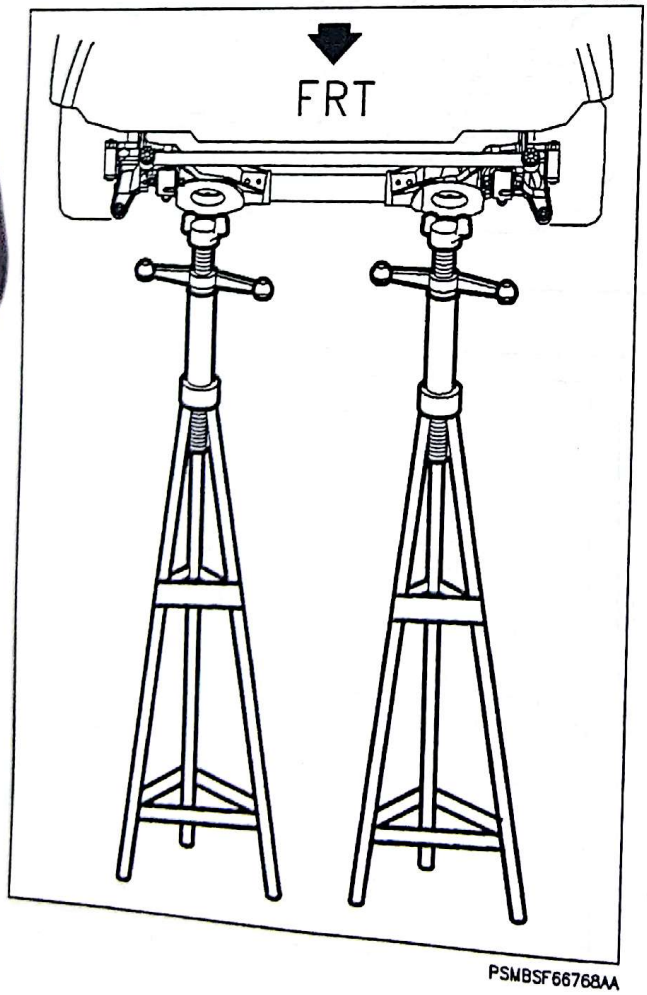

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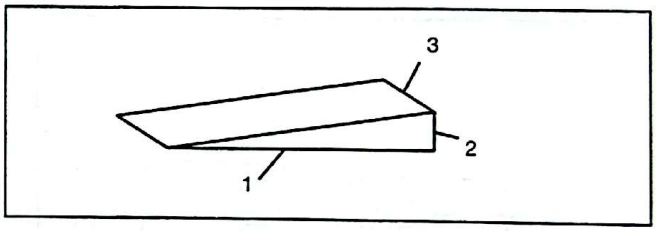
HOISTING/LIFTING FOR A 2 POST INGROUND HOIST - (FRONT AND REAR)

CAUTION: BEFORE ENTERING THE AREA UNDER A RAISED VEHICLE ALWAYS CHECK TO MAKE SURE HOIST SAFETY MECHANISMS ARE ENGAGED OR LIFT SAFETY STANDS ARE IN PLACE.

NOTICE: When using an in ground hoist it is necessary to pay close attention to the ground clearance at the front end of the vehicle. Be careful not to damage any of the front end components.

NOTICE: The aid of a ramp for some models of lifts is helpful for obtaining clearance under the front end of the vehicle. Proper clearance will keep the fascia and underbody components from being damaged when approaching or leaving the hoisting area. Ramp size needed:

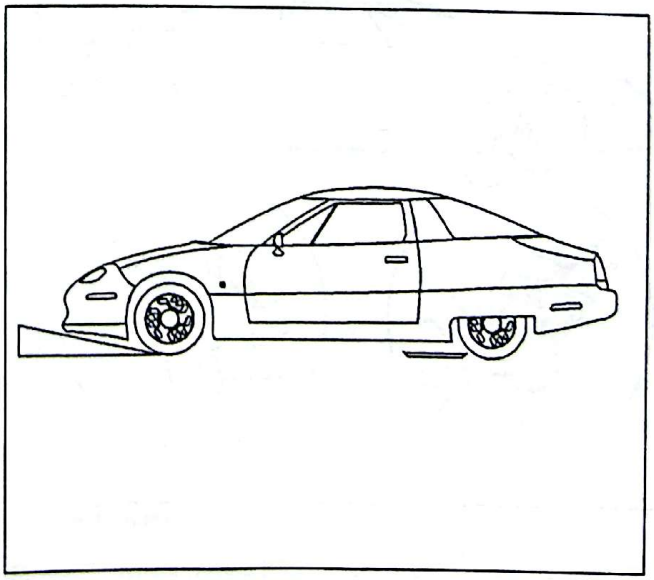
1. **1050 mm in length (41-3/8 in.)**
2. **155 mm in width (6-7/64 in.)**
3. **230 mm in height (9-1/16 in.)**



NOTICE: With the use of ramps, always have a partner who will be outside and in front of the vehicle guide and watch to ensure that proper alignment is achieved to the ramps and hoisting area. Be careful that you don't drive over or slip off the edge of the ramps. Failure to do so could result in damage to under body and mechanical components.

NOTICE: The first vehicle to be lifted using the ramp method may take several attempts to get properly aligned to the hoist pads under the front of the body structure. Marking the floor with tape, paint or permanent marker after the ramp position is determined will aid in the positioning ramps for future EV1 vehicle lifting.

1. Drive the vehicle up to the hoisting area, centering the vehicle to the hoist in its side to side position.
2. Drive vehicle forward until the front of the rear tires contact the rear edge of the rear tire lift tray.
3. Place the ramps on the floor. In front of the vehicle, center each ramp in front of the front tires.
4. Slide ramps rearward until they touch the front of the front tires, or align ramps to markings on floor made from previous lifting as described in the above "NOTICE."



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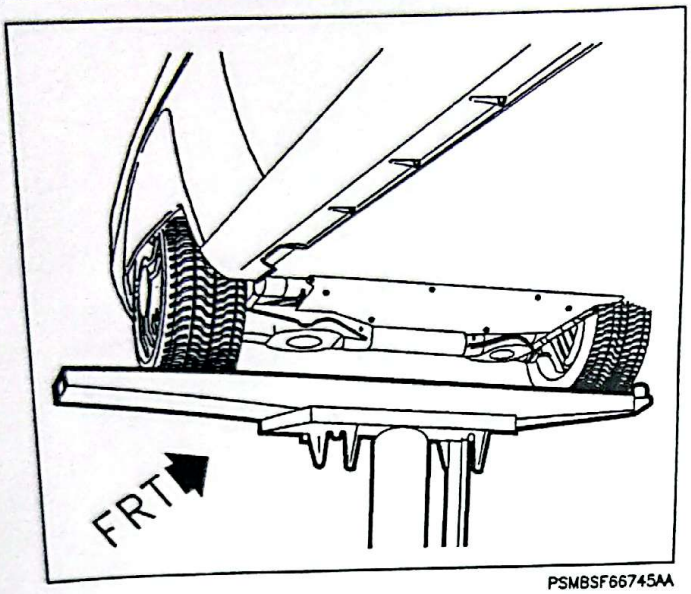

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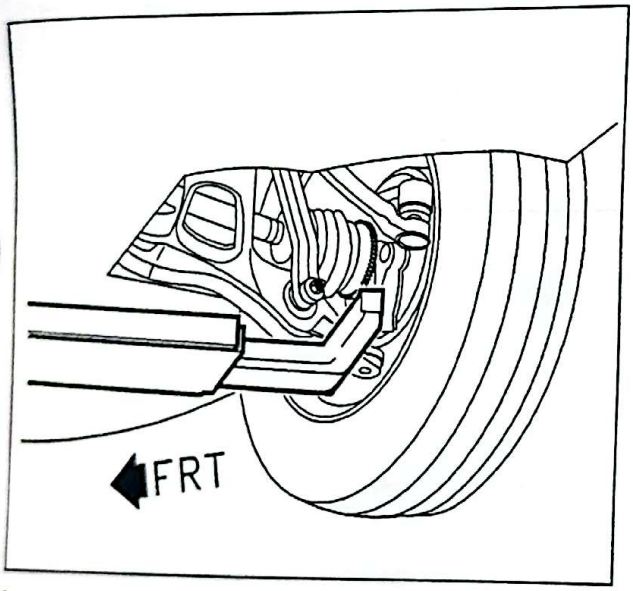
5. Drive forward and up the ramps until the rear tires are centered in the rear tire tray portion of the hoist.



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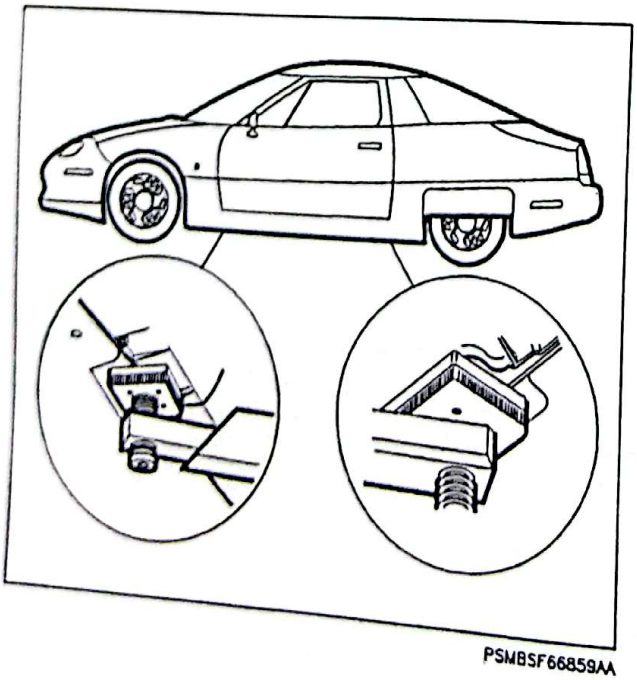
6. Put the front lift pads under the vehicle's front lower control arms at the portion between the ball joint and the yoke.
7. Lift the vehicle to proper working height and position safety stands. (Refer to "Lifting, Jacking, and Support Points" and "Hoisting Lifting with a Floor Jack" sections in this section.)



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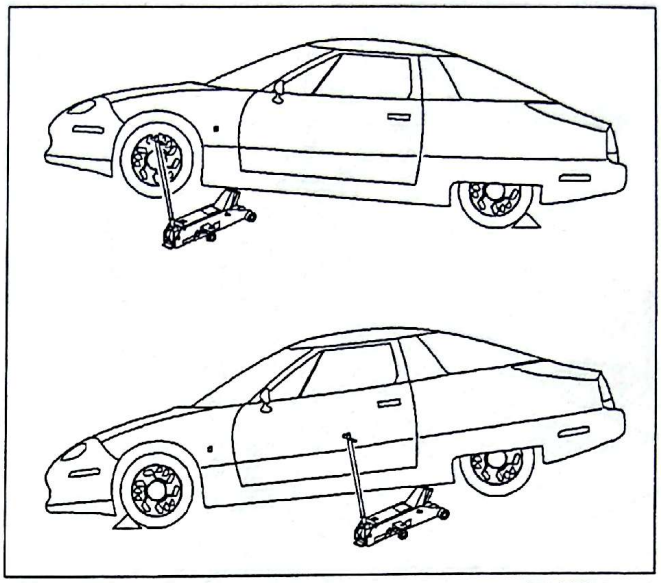
LIFTING WITH A FLOOR JACK

NOTICE: Do not put floor jack under any portion of the vehicle other than locations shown or damage to the structure may occur.

1. Locate the rocker panel pinch weld flange lift/hoist areas, place floor jack in position, seat the lift pad in place, and chock the wheels. (Refer to "General Information" in the "Lifting, Jacking, and Support Points" section in this section.)

CAUTION: TO HELP AVOID PERSONAL INJURY, ALWAYS USE JACK STANDS WHEN WORKING ON OR UNDER ANY VEHICLE THAT IS LIFTED BY A FLOOR JACK OR A HOIST.

2. Lift vehicle with floor jack.



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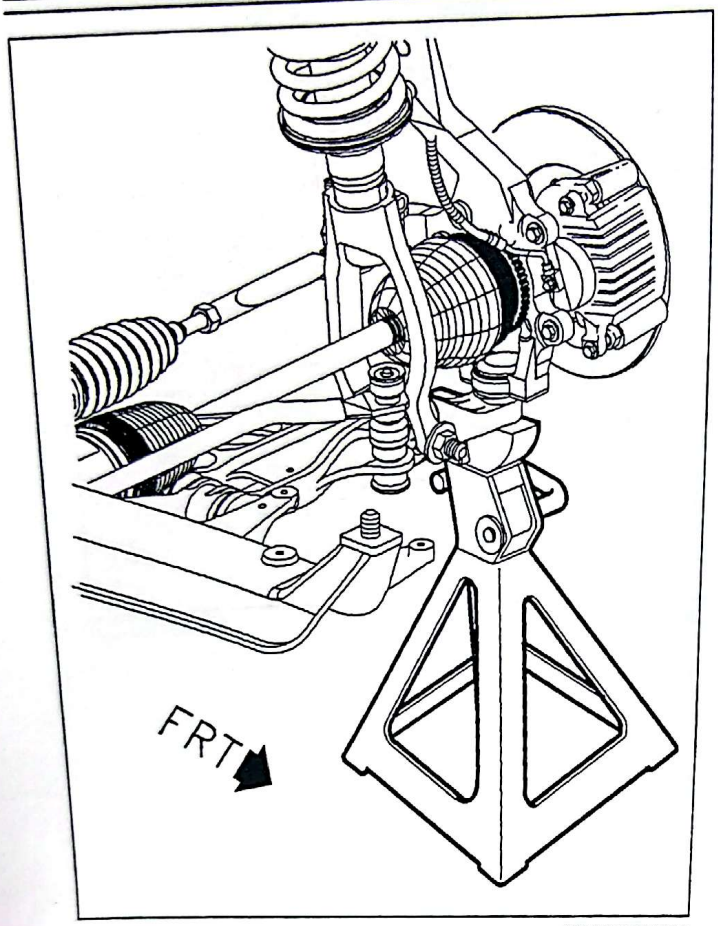

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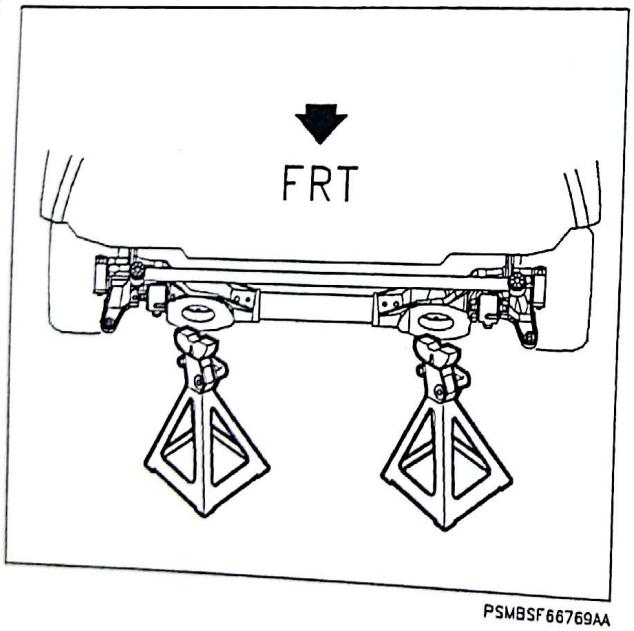

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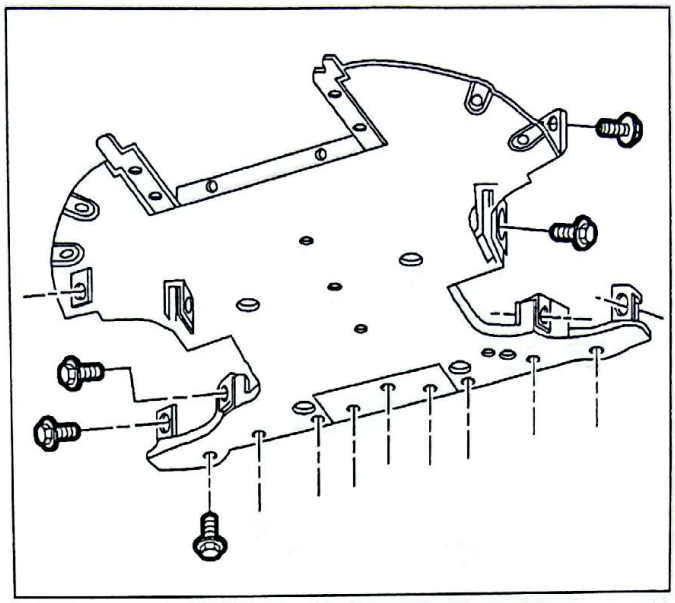
3. Once the vehicle is at the required working height install safety stands.

UNDERBODY FRONT AIR DEFLECTOR

REMOVAL

1. Raise vehicle on hoist. (Refer to "Lifting, Jacking, and Support Points" section in this manual.)
2. Remove bolts retaining underbody front air deflector to underbody center air deflectors.
3. Remove bolts retaining underbody front air deflector to front wheelhouse panel liners.



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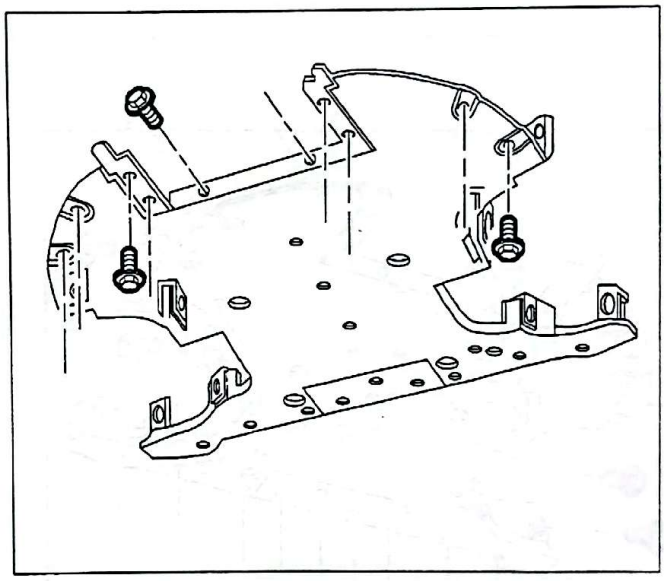
4. Remove bolts retaining underbody front air deflector to front bumper fascia assembly.
5. Remove bolts retaining underbody front air deflector to condenser radiator fan module (CRFM) bracket.



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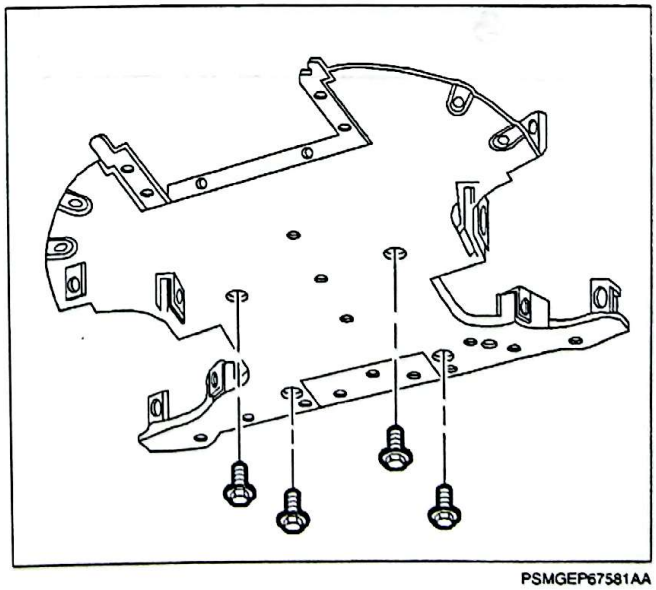
6. Remove bolts retaining underbody front air deflector to side baffles.
7. Remove bolts retaining underbody front air deflector to drivetrain and front suspension crossmember assembly.
8. Lower underbody front air deflector and disengage tabs from front bumper fascia assembly.



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INSTALLATION

IMPORTANT: If bolt threads or "J" nuts threads are damaged during removal or installation, remove bolt and fastener, inspect, and replace if necessary.

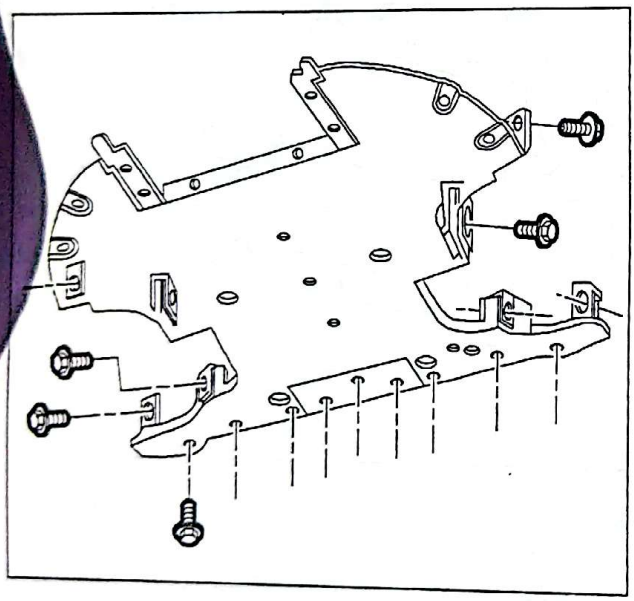
1. Raise front edge of air deflector and engage tabs into retaining slots on front bumper fascia assembly.
2. Raise and support underbody front air deflector to underside of vehicle.

IMPORTANT: Flange on air deflector must be located forward of Condenser Radiator Fan Module (CRFM) bracket.

3. Loosely install bolt retaining air deflector to CRFM bracket.
4. Loosely install bolts retaining underbody front air deflector to front mounting locations of drivetrain and front suspension crossmember assembly.
5. Loosely install bolts retaining underbody front air deflector to rear mounting locations of drivetrain and front suspension crossmember assembly.
6. Install and tighten bolts retaining underbody front air deflector to underbody center air deflectors. Torque as specified.

Torque: 6 N•m (53 in–lbs)

IMPORTANT: If cradle bolt begins to cross thread during installation, stop immediately, remove bolt, then run thread tap (M6.0 mm x 1.0) into insert to repair damaged threads.



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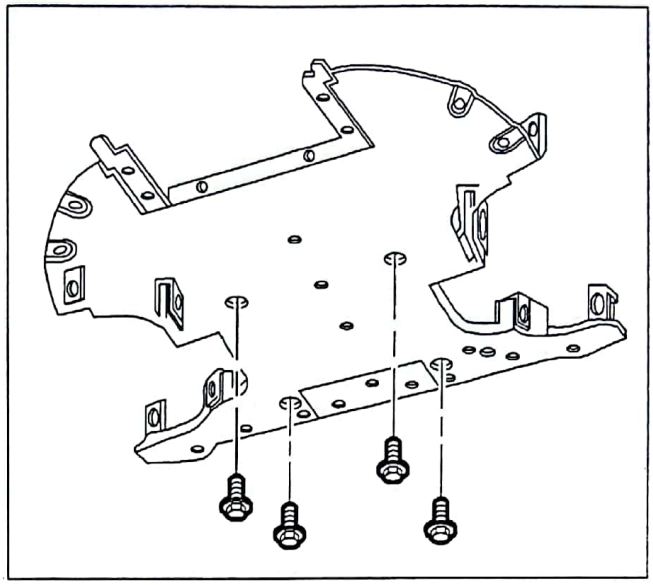
7. Tighten bolts retaining underbody front air deflector to front mounting locations of drivetrain and front suspension crossmember assembly. Torque as specified.

Torque: 6 N•m (53 in–lbs)



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IMPORTANT: At CRFM attachment, position air deflector flange so that it rests up against the bottom of the CRFM lower support.

8. Install and tighten bolt retaining underbody front air deflector to CRFM bracket. Torque as specified.

Torque: 6 N•m (53 in–lbs)

9. Tighten remaining bolt retaining air deflector to CRFM bracket. Ensure underbody front air deflector is up against bottom of CRFM lower support. Torque as specified.

Torque: 6 N•m (53 in–lbs)

10. Install and tighten bolts retaining underbody front air deflector to CRFM to fascia close-out side baffles. Torque as specified.

Torque: 6 N•m (53 in–lbs)

11. Install and tighten bolts retaining underbody front air deflector to front bumper fascia assembly. Torque as specified.

Torque: 6 N•m (53 in–lbs)

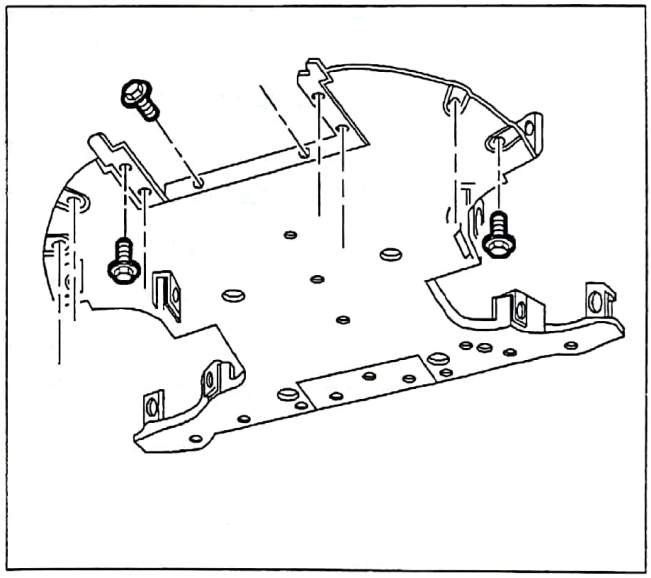
12. Install and tighten bolts retaining underbody front air deflector to front wheelhouse panel liner on one side of the vehicle. Front tires may need to be rotated to access mounting locations. Torque as specified.

Torque: 6 N•m (53 in–lbs)

13. Install and tighten bolts retaining underbody front air deflector to front wheelhouse panel liner on opposite side of the vehicle. Front tires may need to be rotated to access mounting locations. Torque as specified.

Torque: 6 N•m (53 in–lbs)

14. Lower vehicle and turn front wheels to face in a straight ahead position.



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NOTES

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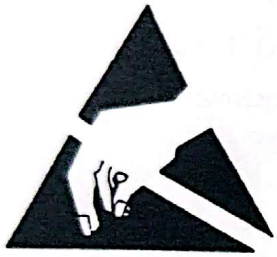
HANDLING ELECTROSTATIC DISCHARGE (ESD) SENSITIVE PARTS

NOTICE: When handling electronic parts identified as ESD sensitive, you should observe the following guidelines. These guidelines reduce possible electrostatic charge build-up from your body and from electronic parts in the Saturn retail facility.

NOTICE



CONTENTS SENSITIVE TO STATIC ELECTRICITY

Do not open protective package until ready to install the part. When installing always touch the package to a ground before opening.

Avoid touching electrical terminals of the part when using a screwdriver or similar tool. Never jump, ground a circuit, or use test equipment probes on any component or connector unless specified to do so by the service manual when diagnosing an electronic system.

Remember solid-state components also can be damaged when bumped, dropped or laid on any metal work benches or components that operate electrically, such as a radio, TV or oscilloscope.

4. Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position or walking a distance.
5. When working with the instrument panel cluster and related internal components, the grounding wrist strap of the anti-static mat (SA9502Z) must be worn and the mat should be properly grounded.

Not all parts that can be damaged by an electrostatic discharge have an ESD label. Components that can be damaged by an electrostatic discharge are:

- Instrument panel cluster (IPC)
- Brake torque control module (BTCM)
- Heat pump ventilation system/thermal control module (HTCM)
- Propulsion control module (PCM)
- Radio
- Run/Lock shifter assembly (RSA)
- Battery pack module (BPM)
- Sensing and Diagnostic Module (SDM)
- Power steering control module (PSCM)

6. Remember solid-state components also can be damaged when bumped, dropped or laid on any metal work benches or components that operate electrically, such as a radio, TV or oscilloscope.
7. Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position or walking a distance.

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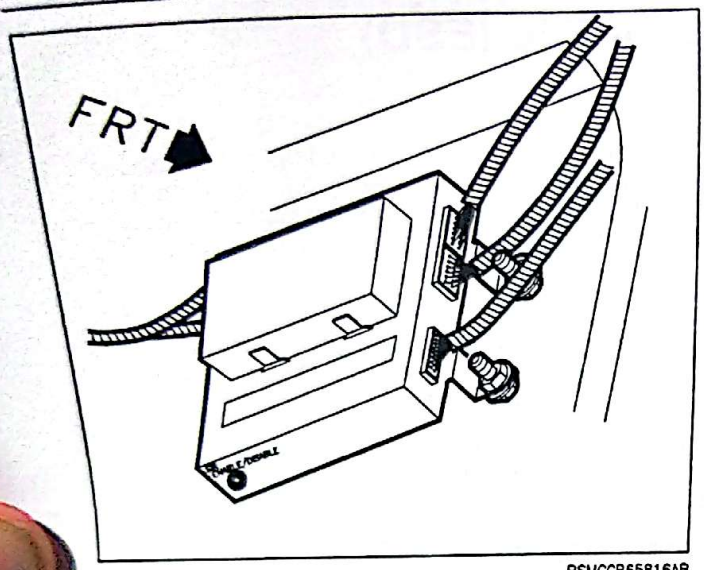

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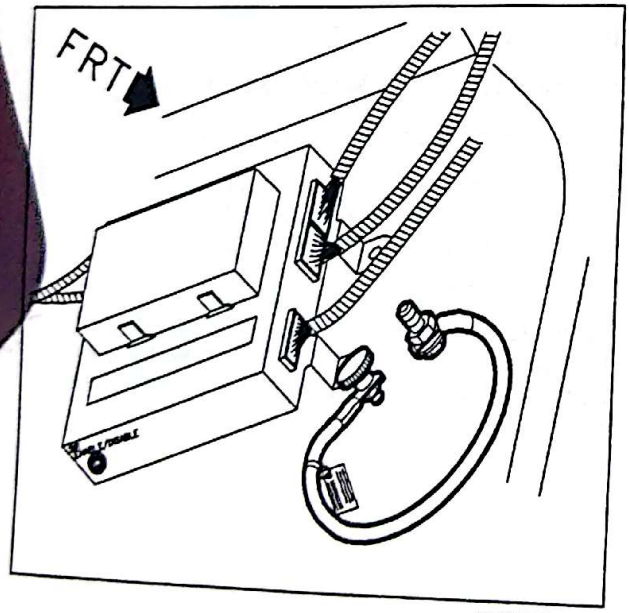
JUNCTION BLOCK GROUND STRAP INSTALLATION / REMOVAL PROCEDURE

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap Installation" in this manual.)

INSTALLATION

1. Place key pad in LOCK mode.
2. Remove the four fasteners that retain the RH or LH junction block.
3. Install junction block ground strap/straps to junction block using the captured fasteners as illustrated and tighten to 10 N•m +/− 2 N•m (89 in−lbs +/− 18 in−lbs).
4. Install the loose end of the junction block ground strap to the junction block mounting stud on front dash, using the existing nut.



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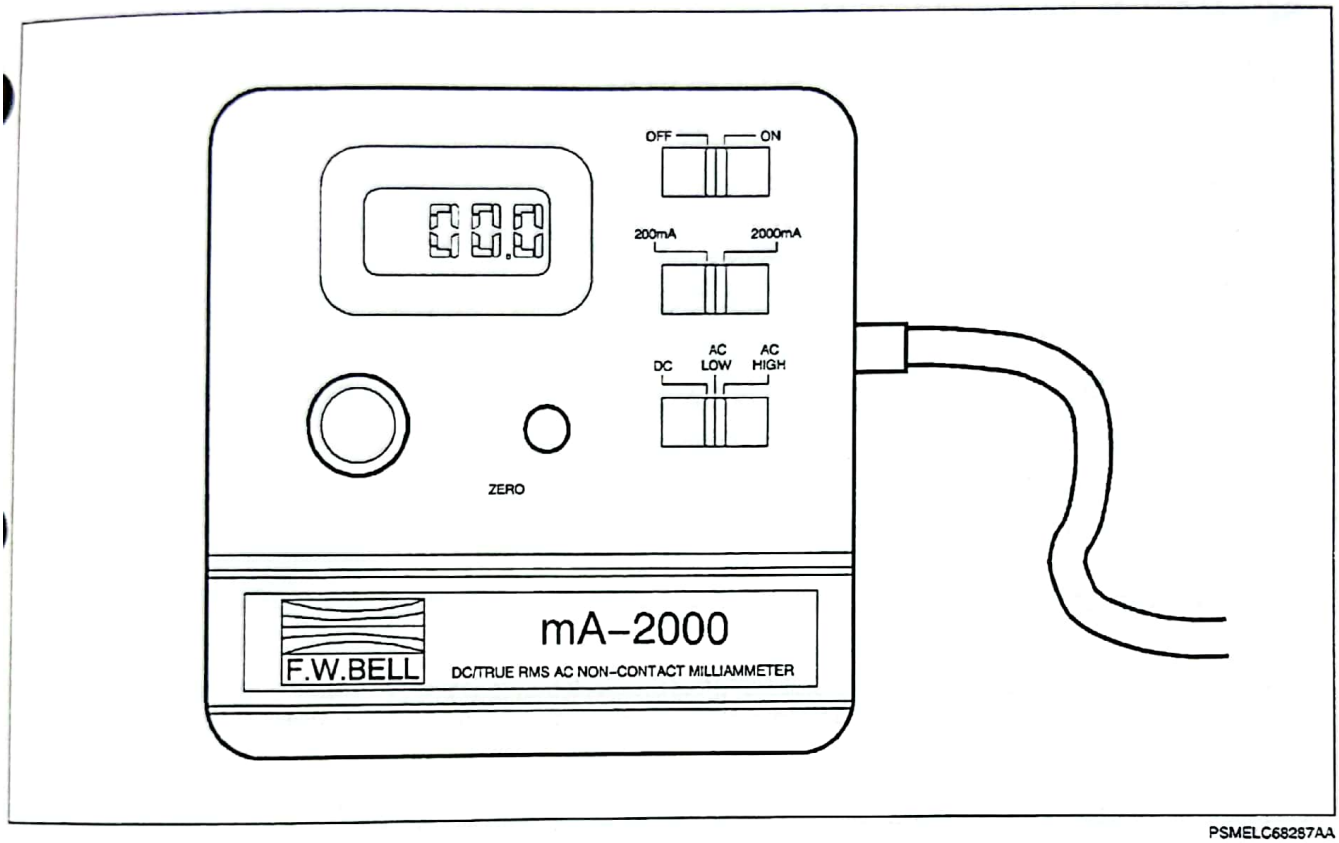
REMOVAL

1. Remove the junction block ground strap from the junction block, RH and LH sides if necessary.
2. Mount the junction block to the front of dash and torque to 10 N•m +/− 2 N•m (89 in−lbs +/− 18 in−lbs).



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PROCEDURE FOR USING LOW CURRENT AMP PROBE – EV9726Z

1. Turn Amp meter On and allow to warm up for a few minutes.
2. Connect inductive pickup to Amp meter.
3. Select 2000mA and DC on the meter switches.
4. Zero reading on amp meter using the coarse (small) and then fine (large) adjustor knobs.
5. Access wire to be read and expose a section long enough to allow pickup to fit between wire and rest of harness.
6. Place wire in pickup, making sure that only that wire is in the pickup and that the pickup contacts close with the wire in the middle of the pickup.

IMPORTANT: If the pickup contacts do not fully close, erroneous readings will be generated. Note that the arrow on the probe indicates the current direction that will generate a positive reading on the meter.

7. Take desired current reading.
8. If other readings are taken, zero meter in between each reading. Re-zeroing may also be necessary as the unit continues to warm up.

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SCAN TOOL INFORMATION

NORMAL MODE (AS DISPLAYED ON THE SSS)

RSA TO BPM

RUN/ACC ACTIVE (YES,NO) – Displays "Yes" while in the RSA commanding RUN or OFF/ACC modes.

COAST DOWN REQ (YES,NO) – Displays "YES" while the coast down button is depressed.

SECURITY TT (ON, OFF) – Displays "ON" while the security mode is active.

ODO MODE REQ (YES,NO) – Displays "YES" momentarily when the TRIP button is pressed.

GAGE MODE REQ (YES,NO) – Displays "YES" momentarily when the GAGE button is pressed.

TRIP RESET REQ (YES,NO) – Displays "YES" momentarily when the RESET button is pressed, whether the trip odometer is selected or not.

E/M MODE REQ (YES,NO) – Displays "YES" momentarily when the EnglishMetric (MI/km) button is pressed.

PRECON ENBL REQ (YES,NO) – Displays "YES" momentarily when the precondition ON button is pressed.

TIME DISPLY REQ (YES,NO) – Displays "YES" after the clock button is pressed and stays latched On until the HR or MN buttons are pressed. The time clock is displayed in the upper right corner of IPC while time request is on.

AIR CIRC REQ (RECIRC,FRESH,NONE) – Displays RECIRC or FRESH momentarily when one of those buttons is depressed. Displays NONE the rest of the time regardless of the mode selected.

AIR FLOW REQ (LOWER,BI–LVL,UPPER,NONE) – Displays LOWER, BI–LVL, or UPPER momentarily when one of those buttons is pressed. Displays NONE the rest of the time regardless of the mode selected.

CLIM CTRL REQ (NONE,COOL,HEAT) – Displays COOL or HEAT momentarily when cool or heat buttons are pressed, displays NONE the rest of the time.

VENT MODE REQ (ON,OFF) – Displays "ON" momentarily when the Vent button is pressed.

REAR DEFOG REQ (YES,NO) – Displays "YES" momentarily when rear defog button is pressed.

FAN SPD UP REQ (YES,NO) – Shows "YES" as long as the Fan up button is being pressed.

FAN SPD DWN REQ (YES,NO) – Shows "YES" as long as the Fan down button is being pressed.

TIME SET (YES,NO) – Shows "YES" while the time set mode is entered (by holding the HR or MN button)

TIME DISPLAY (YES,NO) – Shows "YES" while the time is displayed after pressing the clock or the HR or MN buttons (for five seconds).

FRONT DEICE REQ (YES,NO) – Shows "YES" momentarily when the Front De-ice button is pressed.

FRONT DEFOG REQ (YES,NO) – Shows "YES" momentarily when the Front Defog button is pressed.

CHECK TIRE TT (ON,OFF) – Shows "ON" when the RSA requests the Check Tire Pressure telltale be turned On.

WAIT TT (ON,OFF) – Shows "ON" when the wait telltale is commanded on.

PREC TIME (XX:XX) – Shows the precondition set time in military time.

IPC TO BPM

ODOMETER FAULT (YES,NO) – Shows "YES" when there is an internal IPC fault.

GAGE MODE (USOC, POWER) – Shows USOC when user state of charge is displayed on the IPC and POWER when power use is being displayed.

ODOMETER (#) – shows the season odometer mileage stored in the IPC in kilometers.

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SCANNER MODE

RSA - STATUS FLAGS

T–CODE/FLAG (YES,NO) – The scan tool shows "YES" while a code is set. The service stall system displays all the codes set.

REAR DEFOG (YES,NO) – Shows "YES" while the rear defog button is pressed.

FRONT DEFOG (YES,NO) – Shows "YES" while the front defog button is pressed.

FRONT DEICE (YES,NO) – Shows "YES" while the front de-ice button is pressed.

RECIRC AIR (YES,NO) – Shows "YES" while the recirc air button is pressed.

OUTSIDE AIR (YES,NO) – Shows "YES" while the outside air button is pressed.

UPPER AIRFLOW (YES,NO) – Shows "YES" while upper airflow button is pressed.

BILEVEL AIR FLOW (YES,NO) – Shows "YES" while bi-level air button is pressed.

LOWER AIRFLOW (YES,NO) – Shows "YES" while lower airflow button is pressed.

FAN DOWN (YES,NO) – Shows "YES" while fan down button is pressed.

FAN UP (YES,NO) – Shows "YES" while fan up button is pressed.

COOL (YES,NO) – Shows "YES" while A/C mode button is pressed.

VENT (YES,NO) – Shows "YES" while vent mode button is pressed.

HEAT (YES,NO) – Shows "YES" while heat mode button is pressed.

HVAC OFF (YES,NO) – Shows "YES" while HVAC Off button is pressed.

TIME DAY CLOCK (YES,NO) – Shows "YES" while the clock button is pressed.

MINUTES (YES,NO) – Shows "YES" while minutes button is pressed.

HOUR (YES,NO) – Shows "YES" while hour button is pressed.

PRECON ENABLE (YES,NO) – Shows "YES" while precondition button is pressed.

GAGE BUTTON (YES,NO) – Shows "YES" while gage button is pressed.

ODO MODE (YES,NO) – Shows "YES" while trip button is pressed.

TRIP RESET (YES,NO) – Shows "YES" while reset button is pressed.

ENGLISH/METRIC (YES,NO) – Shows "YES" while English/Metric button is pressed.

DIM UP (YES,NO) – Shows "YES" while dim up button is pressed.

DIM DOWN (YES,NO) – Shows "YES" while dim down button is pressed.

DRVR WIN DOWN (YES,NO) – Shows "YES" while driver window button Down is pressed

DRVR WIN UP (YES,NO) – Shows "YES" while driver window button Up is pressed.

COAST DOWN (YES,NO) – Shows "YES" while coast down button is pressed.

PASS WIN DOWN (YES,NO) – Shows "YES" while passenger window button Down is pressed

PASS WIN UP (YES,NO) – Shows "YES" while passenger window button Up is pressed.

RSA KP CLEAR (YES,NO) – Shows "YES" while RSA keypad clear button is pressed.

RSA KP 9/0 (YES,NO) – Shows "YES" while RSA keypad 9/0 button is pressed.

RSA KP 7/8 (YES,NO) – Shows "YES" while RSA keypad 7/8 button is pressed.

RSA KP 5/6 (YES,NO) – Shows "YES" while RSA keypad 5/6 button is pressed.

RSA KP 3/4 (YES,NO) – Shows "YES" while RSA keypad 3/4 button is pressed.

RSA KP 1/2 (YES,NO) – Shows "YES" while RSA keypad 1/2 button is pressed.

RUN MODE SW (YES,NO) – Shows "YES" while RSA Run button is pressed.

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OFF/ACC MODE SW (YES,NO) – Shows "YES" while the OFF/ACC button is pressed.

LOCK MODE SW (YES,NO) – Shows "YES" while RSA Lock button is pressed.

EXT KP 9/0 (YES,NO) – Shows "YES" while external keypad 9/0 button is pressed.

EXT KP 7/8 (YES,NO) – Shows "YES" while external keypad 7/8 button is pressed.

EXT KP 5/6 (YES,NO) – Shows "YES" while external keypad 5/6 button is pressed.

EXT KP 3/4 (YES,NO) – Shows "YES" while external keypad 3/4 button is pressed.

EXT KP 1/2 (YES,NO) – Shows "YES" while external keypad 1/2 button is pressed.

PARKLAMP POWER (ON,OFF) – Shows "ON" while parklamps are turned On.

PARK POS DETECT (YES, NO) – Shows YES whenever the switch in the RSA indicates the PRND is in Park.

EITHER DOOR (OPEN,CLOSED) – Shows OPEN whenever a door is open.

PARK SELECT (YES,NO) – Shows "YES" whenever the PRND switch on the drive motor is in park.

MFG SELF TEST (ON,OFF) – Shows ON when manufacturing self test is being performed.

LOW TIRE RESET (ON,OFF) – Shows ON when low tire switch is pressed.

RUN1 (ON, OFF) – Shows ON while RUN1 is commanded On.

RUN 2 (ON,OFF) – Shows ON while RUN2 is commanded On.

WIPER GROUND (ENABLE, DISABLE) – Shows ENABLE while accessory command (grounded circuit) from the RSA to the wiper module (in the Junction Block) is active.

MAP LIGHT CTRL (YES,NO) – Shows "YES" while dome lamp is powered On by the RSA dim up button.

DRVR WIN UP RLY (YES,NO) – Shows "YES" while left window up relay is active.

DRVR WIN DN RLY (YES,NO) – Shows "YES" while left window down relay is active.

PASS WIN UP RLY (YES,NO) – Shows "YES" while right window up relay is active.

PASS WIN DN RLY (YES,NO) – Shows "YES" while right window down relay is active.

RUN MODE LED (ON,OFF) – Shows ON while Run mode LED is lit.

OFF/ACC LED (ON,OFF) – Shows ON while Off/Accessory mode LED is lit

FRONT DEICE LED (ON,OFF) – Shows ON while Front De-Ice LED is lit.

FRONT DEFOG LED (ON,OFF) – Shows ON while Front Defog LED is lit.

PRECON ON LED (ON,OFF) – Shows ON while Preconditioning LED is lit.

UP AIRFLOW LED (ON,OFF) – Shows ON while Upper airflow LED is lit.

BI AIRFLOW LED (ON,OFF) – Shows ON while Bi-Level airflow LED is lit.

LO AIRFLOW LED (ON,OFF) – Shows ON while Lower air flow LED is lit.

REAR DEFOG LED (ON,OFF) – Shows ON while Rear Defog LED is lit.

VENT LED (ON,OFF) – Shows ON while Vent LED is lit.

HEAT HI LED (ON,OFF) – Shows ON while Heating high LED is lit (in high mode).

HEAT MED LED (ON,OFF) – Shows ON while Heating medium LED is lit (in medium and high modes).

HEAT LO LED (ON,OFF) – Shows ON while Heating low LED is lit (in low, medium, and high modes).

COOL HIGH LED (ON,OFF) – Shows ON while Cooling high LED is lit (in high mode).

COOL MED LED (ON,OFF) – Shows ON while Cooling medium LED is lit (in medium and high modes).

COOL LOW LED (ON,OFF) – Shows ON while Cooling low LED is lit (in low, medium, and high modes).

RUN/ACC OUTPUT (ON,OFF) – Shows ON whenever key minder is On (one of the doors open and the vehicle still in Run/Acc mode).

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SECURITY TT (ON,OFF) – Shows ON when the Security telltale is turned On.

FAN SPEED 1 LED (ON,OFF) – Shows ON when the #1 LED for low fan speed is lit.

FAN SPEED 2 LED (ON,OFF) – Shows ON when the #2 LED for medium–low fan speed is lit.

FAN SPEED 3 LED (ON,OFF) – Shows ON when the #3 LED for medium fan speed is lit.

FAN SPEED 4 LED (ON,OFF) – Shows ON when the #4 LED for medium–high fan speed is lit.

FAN SPEED 5 LED (ON,OFF) – Shows ON when the #5 LED for high fan speed is lit.

RADIO WAKEUP (ON,OFF) – Shows ON when the Radio power from the RSA is being provided.

OUTSIDE AIR LED (ON,OFF) – Shows ON when the Outside air mode LED is lit.

RECIRC AIR LED (ON,OFF) – Shows ON when the Recirculation air mode LED is lit.

COAST DOWN LED (ON,OFF) – Shows ON when the Coast down LED is lit.

VALID KEY LED (ON,OFF) – Shows ON when the Valid code LED is lit.

EXT DOOR UNLOCK (YES,NO) – Shows YES when door unlock activated from External Key Pad (EKP).

RSAKP FACT MODE (ON,OFF) – Shows ON when in RSA keypad programming mode for the very first time on RSA.

RSAKP USER MODE (ON, OFF) – Shows ON when in programming mode to program keycode.

EXTKP FACT MODE (ON,OFF) – Shows ON when in EKP programming mode for the very first time on RSA.

EXTKP USER MODE (ON,OFF) – Shows ON when in programming mode to program keycode

KEY PAD LIGHT (ON,OFF) – Shows ON when the External Keypad backlighting is lit.

RADIO DIM LVL (%) – Shows Radio Vacuum flourescent dim level in % between 0% and 50% (0, 10, 15, 20, 25, 30, 35, 45, 50).

BACKLITE LVL (%) – Shows RSA, Radio, IPC, and park brake switch backlighting dim level in % between 20% and 100%. (20, 25, 35, 45, 55, 60, 70, 80, 90, 100).

LED DIM LVL (%) – Shows LED dim level between 35% and 100% (35, 45, 55, 65, 75, 85, 95, 100,100).

CTPS STATE (INITIAL, NV_DATA, NS_SPEED, ALARM, CAL, CAL-MON, MON LEAK) – Shows status of Check Tire pressure system. INITIAL (initialize) is only shown for a moment while the low tire pressure reset switch is held. NV_DATA (no valid data) means there is a problem reading the wheel speed signals. A BTCM code should be set in this case. NS_SPEED (no stable speed) means the data is currently not stable enough to use for calibration or detection. It is normal to see NS_SPEED during acceleration, braking, and some other driving maneuvers. ALARM means a tire pressure variation has been detected. CAL (calibration) means the vehicle is still calibrating. CAL–MON (calibration–monitor) means the vehicle is roughly calibrated in one or more speed ranges. The vehicle may still not be able to monitor in any or all speed ranges. MON LEAK means the vehicle is calibrated in all speed ranges and is monitoring wheel speeds

FRONT OFFSET (#) – Shows the difference between the front left and right tires in rotation speed. Shows zero when stopped. During normal driving numbers of up to +/– 300 are common. If numbers reach or exceed +/– 1000, especially at lower speed ranges, the vehicle is detecting a significant speed variation.

REAR OFFSET(#) – Same as FRONT OFFSET only for the rear wheels.

15–40 CAL (RAW, CONVERGE OFF) – Shows RAW until raw calibration is complete in the 15–40 mph range, shows CONVERGE until convergence calibration is complete in the 15–40 mph range. Shows OFF when calibration in the 15–40 mph speed range is complete.

40–65 CAL (OFF, RAW, CONVERGE) – Same as 15–40 CAL only for 40–65 mph.

65–80 CAL (OFF, RAW, CONVERGE) – Same as 15–40 CAL only for 65–80 mph.

15–28 MON (OFF, REDUCED, FULL) – Shows OFF when the related calibration ranges (refer to CTPS section "Detection") are in the OFF or RAW states. Shows REDUCED when the related calibration ranges are not completely calibrated and reduced monitoring is taking place. Shows FULL when full monitoring is taking place.

28–53 MON (OFF, REDUCED, FULL) – Refer to 15–28 MON

53–80 MON (OFF, REDUCED, FULL) – Refer to 15–28 MON

CTPS ACCUM (#) – The accumulator value is determined by the offsets and other calculated data. When the accumulator value is above zero and growing, the system is detecting a low tire condition. When the value reaches approximately 11,520 the CTPS telltale is turned on.

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IPC

VEHICLE ID

VIN (#) – Vehicle Identification Number (VIN)

IPC

GENERAL INFORMATION

REDUCED PERF TT (ON, OFF) – Shows ON when REDUCED PERF telltale commanded On.

BATTERY LIFE TT (ON, OFF) – Shows ON when BAT LIFE telltale commanded On.

CHECK TIRE TT (ON, OFF) – Shows ON when CHECK TIRE PRESSURE telltale commanded On.

SEATBELT TT (ON, OFF) – Shows ON when SEATBELT telltale commanded On.

SERVICE NOW TT (ON, OFF) – Shows ON when SERVICE NOW telltale commanded On.

WAIT TT (ON,OFF) – Shows ON when WAIT telltale commanded On.

TEMP TT (ON, OFF) – Shows ON when TEMP telltale commanded On.

AIR BAG TT (ON, OFF) – Shows ON when SIR telltale is turned on by SDM.

RGHT TURN INPUT (ON,OFF) – Flashes ON when right turn signal indicator On.

LEFT TURN INPUT (ON,OFF) – Flashes ON when left turn signal indicator On.

MFG TEST (YES,NO) – Shows YES while manufacturing test is in progress.

RUN/ACC OUTPUT (ON, OFF) – Shows ON when vehicle in RUN mode.

DRIVER SEATBELT (ON,OFF) – Shows ON when drivers seat belt buckle switch is latched.

HIGH BEAM TT (ON,OFF)– Shows ON while the high beams are turned On or held on with flash to pass.

PARKLAMPS (ON,OFF) – Shows ON while parklamps are On.

EITHER DOOR (OPEN,CLOSED) – Shows OPEN when driver or passenger doors are closed.

RUN 1 (ON, OFF) – Shows ON when Run1 power is On.

VF PWR ENABLE (ON,OFF) – Shows YES whenever VF power is on.

CHIME PWR ENBL (ON,OFF) – Shows ON whenever power is available for chime.

RUN 1 (#) – Shows the Run1 voltage level.

DIM INPUT (#) – Shows the Dim input volts
(values read by pressing dim up/down switches – 0.0 Off, then 1.7, 1.8, 2.1, 2.3, 2.6, 2.8, 3.0, 3.3, 3.5, 3.7).

HWS ROTATION (#) – Shows the handwheel sensor input voltage. The value varies up and down between about 0.5 and 4.4 up and down repeatedly as the wheel is turned.

PARKLAMP REF (#) – Shows the parklamp voltage input to the IPC.

PROM ID (ALPHA/#) – Shows the Prom ID #

STRG PWM DUTY % (#) – Shows the PWM commanded duty cycle from the IPC (with vehicle speed = 0: 48 idle, 83 with steering input–returns to 48 after four seconds).

VF DIM PWM DTY (%) – Shows the vacuum flourescent PWM duty cycle (values read by pressing dim up/down switches – 0, 0, 1, 1, 2, 3, 5, 6, 8, 15)

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VEHICLE ELECTRICAL DIAGNOSIS

TROUBLE SHOOTING GUIDES

NOTICE: When trouble shooting an electrical system, make sure there are no electrical loads on, except for the circuits or system being tested. This will help prevent false readings.

BEFORE TROUBLE SHOOTING

1. Visually inspect the wires and connectors.
2. Verify that terminal pins are clean and that there are no loose pins or terminals.
3. Verify that the Weather-Pac connectors are in good condition and sealed properly.
4. Check the maxifuse or positive temperature coefficient (PTC) used to protect the circuit or system being tested.
5. Check the battery for damage, state of charge, and for clean and tight connections.

FIVE-STEP TROUBLE SHOOTING

1. Verify the complaint.
   - Perform the System Performance Test, if the section has one, outlined at the beginning of each section. Do not fix only part of the problem. Do not begin disassembly or testing until you have narrowed down the possible causes.
2. Consult the Diagnostic Flow Charts and analyze the electrical schematic for the system being tested.
   - Use the Diagnostic Fllow Chart, to find the possible cause of the problem.
   - Look at the electrical schematic for the problem circuit. Determine how the circuit is supposed to work and look for maxifuses, wires and ground shared with other systems or components. See if a shared wired is at fault by checking the other components fed by the wire.
   - Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.
3. Isolate the problem by testing the circuit. Use diagnostic service probes as needed on 18, 20, and 22 gage wires.
   - Perform circuit tests to check the diagnosis made in step two. You can either test for the most likely cause of failure first, or perform the tests which are most easily and quickly done.
   - Generally, fuses and grounds are easiest to check.
4. Fix the problem.
   - Once the problem is identified, make the repair. Make sure to use the proper tools and safe methods mentioned in this service manual.
5. Make sure the circuit works.
   - Turn on all components in the repaired circuit in all modes of operation. Make sure no new problems have come up and that the original problem has been fixed.

HELPFUL HINTS

1. If a fuse is blown, or a PTC is open look for a short to ground in the circuits between the junction block and the component or an internal component short. The short may also be in a circuit that is switched, such as a circuit beyond a relay contact or a electronic component that controls a circuit.
2. Before checking the integrity of a circuit by means of a voltmeter or ohmmeter, check to see if other components or systems fed or grounded by the circuit are operating properly.
3. Verify that the connector pin terminals are not spread apart, broken, worn, or corroded due to salt water, antifreeze, etc.
4. Verify that the terminals and pins are in their correct cavities.
5. Opens normally occur at connectors and terminals.
6. Use the diagnostic service probe and a multimeter to diagnose circuits that contain 18, 20, or 22 gage wires. The diagnostic service probe causes a minimum of disturbance to the circuit wiring and connections.

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CAUTIONS

CAUTION: FAILING TO FOLLOW THE FOLLOWING PROCEDURES COULD RESULT IN SERIOUS PERSONAL INJURY OR PROPERTY DAMAGE.

CAUTION: ALWAYS REMOVE THE 60 AMP MAXI FUSE WHEN REPLACING COMPONENTS ON A VEHICLE.

CAUTION: REMOVE RINGS, WATCHES AND ALL OTHER JEWELRY.

CAUTION: WHEN WORKING AROUND THE BATTERY, ALWAYS SHIELD YOUR EYES. AVOID LEANING OVER THE BATTERY IF POSSIBLE.

CAUTION: DO NOT ALLOW BATTERY FLUID TO CONTACT EYES, SKIN, FABRICS OR PAINTED SURFACES; BATTERY FLUID IS A CORROSIVE ACID. FLUSH ANY CONTACTED AREA WITH WATER IMMEDIATELY AND THOROUGHLY, AND GET MEDICAL HELP.

CAUTION: BE CAREFUL THAT METAL TOOLS DO NOT CONTACT THE POSITIVE BATTERY TERMINAL (OR METAL IN CONTACT WITH TERMINAL) AND ANY OTHER METAL ON THE VEHICLE; A SHORT COULD OCCUR.

CAUTION: DO NOT EXPOSE A BATTERY TO OPEN FLAMES OR SPARKS (INCLUDING LIT TOBACCO). BATTERIES PRODUCE A GAS WHICH IS FLAMMABLE AND EXPLOSIVE.

CAUTION: NEVER WEAR LOOSE OR BAGGY CLOTHING AROUND MOVING MACHINERY. REMOVE TIES AND ANY HANGING JEWELRY, AND TIE BACK LONG HAIR.

READING WIRING SCHEMATICS AND SYMBOLS

SCHEMATICS

Each electrical section includes an electrical schematic for the system described in the section. This schematic includes only the fuses, positive temperature coefficient (PTC) devices, wiring and components required for the system. This prevents you from being distracted by wiring that is not part of the circuit you are working on.

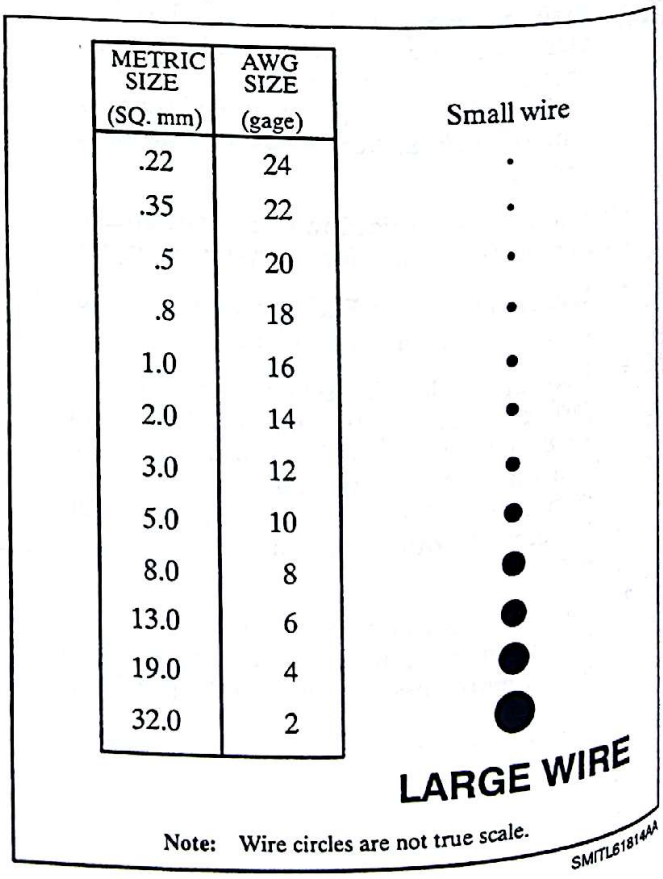
IMPORTANT: For your convenience, all electrical schematics are included in this manual.

It is important to realize that no attempt is made to represent components and wiring as they physically appear on the vehicle.

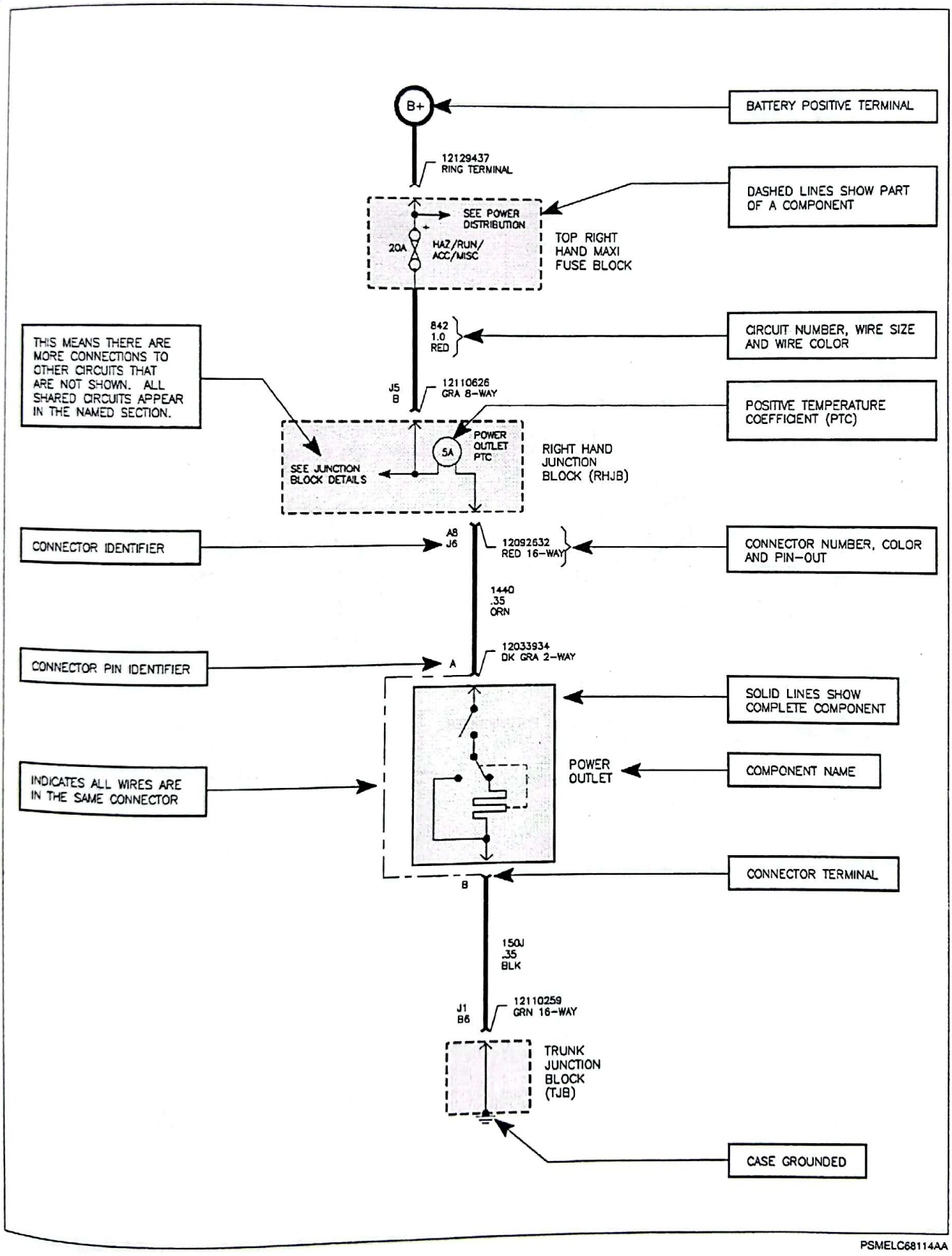
For example, a four-foot length of wire is treated no differently in the electrical schematic than a 12-inch piece of wire.

WIRE SIZES

METRIC SIZE (SQ. mm)	AWG SIZE (gage)
.22	24
.35	22
.5	20
.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8
13.0	6
19.0	4
32.0	2



POWER OUTLET SCHEMATIC – SYMBOLS EXAMPLE



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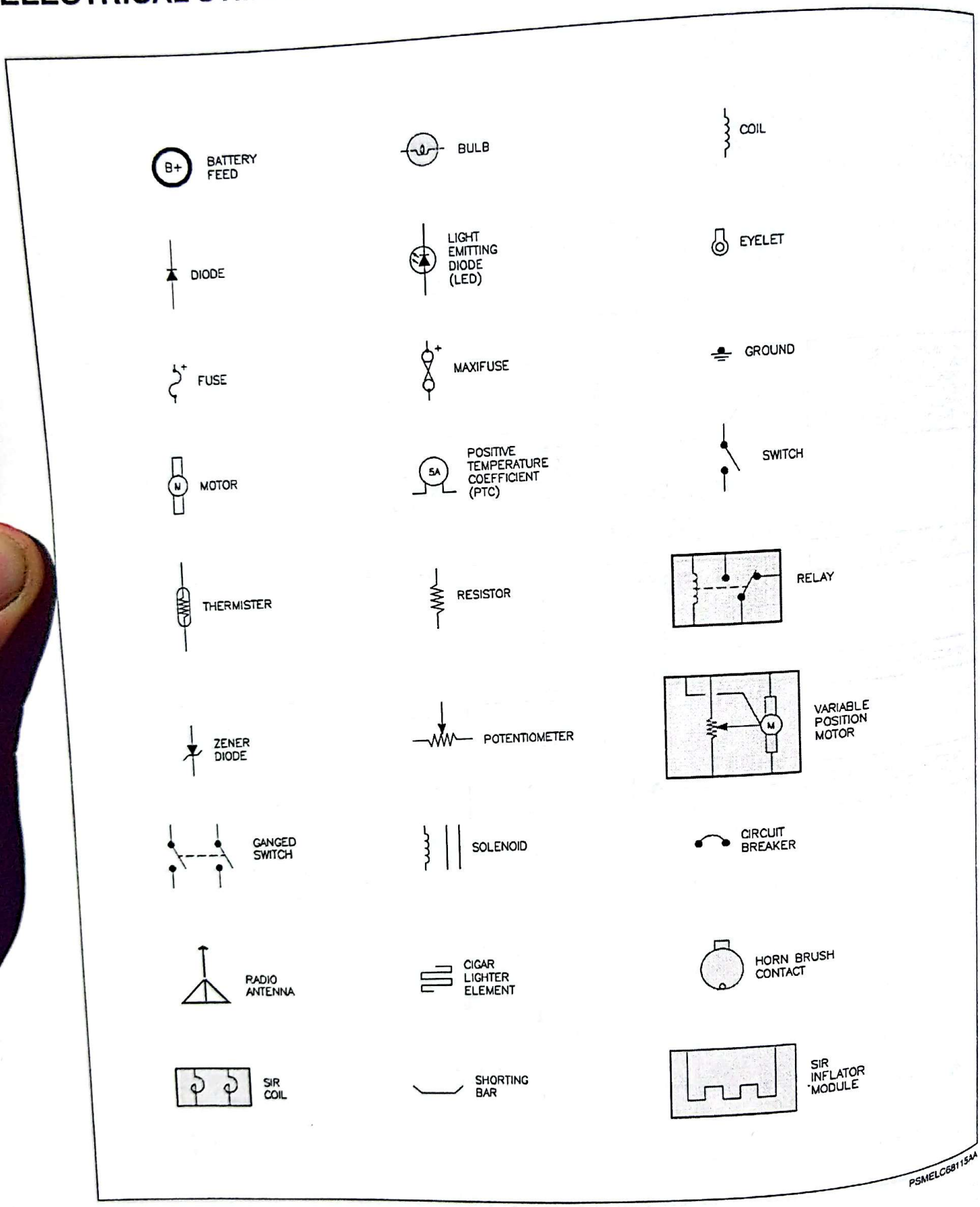
ELECTRICAL SYMBOLS



DIGITAL MULTIMETER USAGE

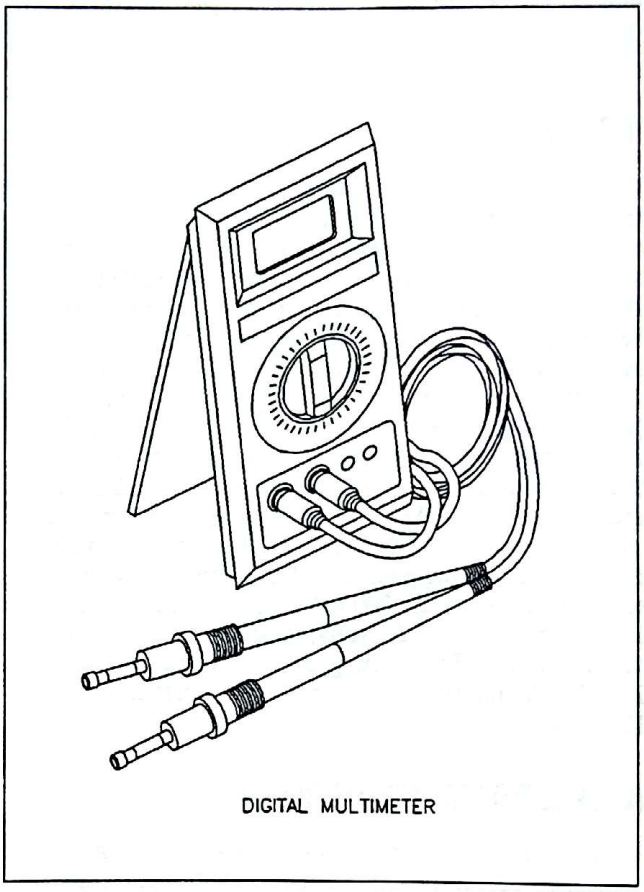
INTRODUCTION TO DIAGNOSIS OF ELECTRICAL FAULTS

A digital multimeter is required to quickly and accurately diagnose most electrical faults. Due to the complexity of the circuitry and the use of electronic components, a multimeter is required to safely test the electrical circuits on an Electric vehicle. A test light should not be used to troubleshoot electrical circuits on a Saturn vehicle.

A test light is a low-resistance *load* on an electrical circuit. On most test lights used today, this low-resistance is 50 ohms. Since electronics are designed to be used with high-resistance circuits, using a low-resistance test light can cause damage to an electronic module. Another problem that occurs when using a test light is accuracy. During some testing procedures, you will be asked to test for a certain voltage. For example, from 8–16 volts. With a test light it is impossible to determine the difference between 7.5 volts and 8.0 volts. A digital voltmeter will display the exact voltage on a circuit.

Another problem with test lights are the sharp probe tip that is often used to probe wires. Probing a wire with a test light, or any other sharp pointed instrument, can break strands of the wires and cause future circuit failures. Also, a break in the insulation allows the wire core to act as a *wick* pulling in moisture, not only damaging the wire, but allowing it to enter connectors and components. This moisture can include salt, antifreeze and other fluids as well as water. Some of these contaminants cause corrosion in the wire or connector. Corrosion increases a circuits resistance, and in electronic circuits, even a small increase in resistance can give a false reading from a sensor to an electronic module.

DIGITAL MULTIMETER



DIGITAL MULTIMETER

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Digital multimeters approved for use on Electric vehicles must have an input impedance of ten megohms (10,000,000 ohms). Input impedance is listed in the multimeter's owner guide.

IMPORTANT: The input impedance of a multimeter stands for the resistance between the red and black leads, only when you are measuring voltage. When measuring resistance, the only resistance other than in the circuit being measured is in the actual leads being used.

A digital multimeter performs all the tests that a test light can perform, with a greater degree of accuracy. In addition, a multimeter can be used to test for current flow in a circuit.

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IMPORTANT: Always follow the manufacturers recommendation when checking for current. All multimeters have a maximum current rating, do not exceed this rating. Not all multimeters contain a fuse that protects the multimeter from damage if a larger current draw is experienced. So be careful when checking for current draw.

VOLTAGE

Voltage is the electrical pressure in the circuit and is the most commonly used electrical test setting on the multimeter. Most digital multimeters have a number of different voltage scales. To determine what scale to use, always use the lowest scale on the multimeter that can be used to test the circuit. For example, if the multimeter has a 200 millivolt scale, a 20 volt scale and a 200 volt scale, and you are testing for battery voltage (approximately 12–14 volts), set the multimeter to the 20 volt scale. If you should select a scale that is too low, the meter indicates this by displaying a *1* or an *OL* on the display. This will not harm the multimeter, and you can always select a higher scale until a good reading is obtained. The same goes for selecting too high of a scale. If you select the 200 volt scale and you are testing for battery voltage (12.8 volts), most multimeters will display 12 volts. By selecting the next smallest scale, 20 volts, the multimeter's display will change to 12.8 volts.

AMPERAGE (CURRENT)

Since a multimeter has a very low resistance when measuring current, caution must be used to prevent damage to the multimeter. Always check the recommendations, listed in the multimeter's owner guide for the maximum current to be tested for. As previously mentioned, most multimeters are protected by a fuse when checking for current. However, not all multimeters are protected, and excessive current will damage a multimeter.

The most common use for measuring current in automotive applications is checking for parasitic current drain. This is the amount of current being drawn by the vehicle with all electrical loads off. The normal parasitic current drain for an Electric vehicle is less than 15 milliamps. This current drain comes from components that require voltage to sustain a memory circuit such as the clock, radio, propulsion control module, etc. However, when checking for parasitic current drain, always check to see if the customer has installed any non-factory installed items that could require constant voltage such as a cellular phone, anti-theft system, etc.

CONTINUITY/RESISTANCE/ DIODE

This group of settings on a multimeter allow you to accurately test for continuity and determine the resistance of many vehicle components.

CONTINUITY

To check for continuity in a circuit use the lowest ohm scale available. Place the leads of the multimeter on each end of the circuit or component being tested. A reading of less than one ohm indicates acceptable continuity.

RESISTANCE

To test for resistance values, place the leads of the multimeter on each side of the circuit or component being tested. Adjust the ohm settings on the multimeter until an acceptable reading is displayed. The lowest scale that gives a reading without going over the range (*1* or *OL*) gives the most accurate reading. Compare the reading displayed on the multimeter to the specification found in the service manual or bulletin. Verify that the scale reading on the multimeter is the same as in the specification (megohms, kilohms or ohms).

NOTICE: When using a multimeter on the ohmmeter or diode test scale, make sure the circuit or component is disconnected from a power source. Applying voltage to a multimeter when you are measuring resistance can damage the multimeter.

DIODE TESTING

Most digital multimeters have a *Diode* setting. This setting is used to test a diode to verify current flows in only one direction.

A good diode will display between 0.4 and 0.8 volt on the meter when the leads are forward biasing the diode, this indicates the diode is allowing current to flow in that direction. When the leads are reversed, the meter should read *1* or *OL*, indicating the diode is blocking the flow of current in the opposite direction. This indicates a good diode. If the diode allows current flow in both directions or prevents current flow in both directions, the diode is damaged and should be replaced.

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MULTIMETER DISPLAY READING

MEGA	KILO	READING	MILLI	MICRO
Display x 1,000,000	Display x 1,000	As displayed	Display ÷ 1,000	Display ÷ 1,000,000

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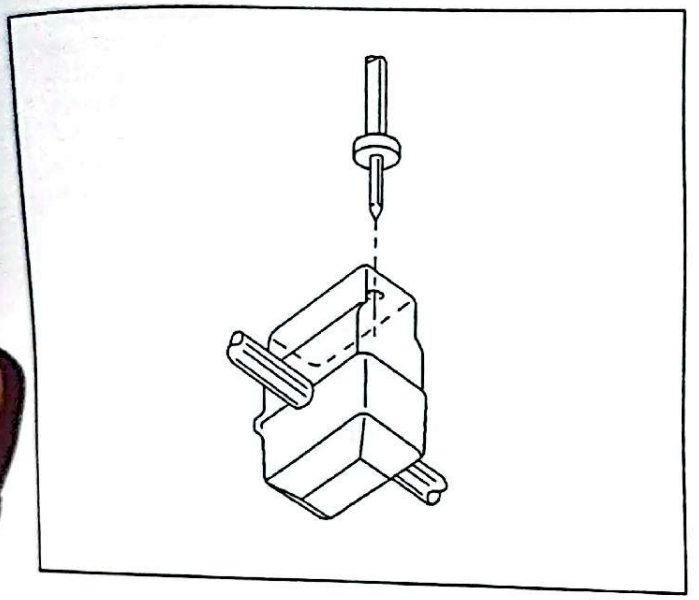
DIAGNOSTICS USING THE DIAGNOSTIC SERVICE PROBE

DIAGNOSTIC SERVICE PROBE

IMPORTANT: Diagnostic service probes are for use on .35, .50 and .80 mm (22, 20 and 18 gage) wires only.

IMPORTANT: The diagnostic service probes must be left on the wire after use. The probe contains a sealant that will protect the wire from corrosion. Do not remove the diagnostic service probe after use.



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The use of the diagnostic service probe offers many advantages in system diagnostics over the old *jumper wire* and *terminal back-probe* methods. The most important advantage of the diagnostic service probe method of diagnostics is the ability to observe the operation of a circuit without disturbing the components or connections. This is an important advantage since many circuit failures are vibration or connection related. The diagnostic service probe is designed to firmly hold multimeter test probes to allow more accurate readings while the circuit is operating. Circuits with bad connectors, grounds or components are easier to diagnose while they are operating.

Attach the diagnostic service probe to the wire leading to the connector and insert your multimeter into the diagnostic service probe. Put the meter on the appropriate scale and observe the readings. If the readings do not compare with the expected readings, gently wiggle the wire back and forth in the connector. If the reading on the meter changes while you are wiggling the wire, the terminal or connector are faulty. Disconnect the connector and examine the terminals and connector cavities for damage. Check the terminals to see if a known good terminal makes a firm connection. Do this by inserting a known good male terminal into the female terminal you are testing. The male terminal should be held firmly in place by the female terminal and should not be loose enough to fall out if the female terminal is held downward.

Likewise, test a male terminal by inserting it into a known good female terminal. The two terminals should fit snugly together and should not separate if the male terminal is held vertically downward.

If the connections are good (both wire connections and the connection to the component), check the ground connection. Attach a diagnostic service probe to the ground side of the circuit or component. Place a multimeter probe in the diagnostic service probe and the other probe to a known good ground.

NOTICE: Check the accuracy of the multimeter first by touching the leads together. The meter should read less than 0.10 ohm with the leads touching.

Place the multimeter on the lowest ohmmeter scale. The meter should read less than one ohm. If the meter reads more than one ohm, check the connections to the ground attachment point. Attach a jumper wire from the ground attachment point. Attach the other end of the jumper wire to a known good ground and watch the multimeter to see if the reading goes below one ohm. If the reading goes below one ohm, remove the ground screw or nut, clean the connection surfaces and install. If the reading stays above one ohm, check for an open in the ground wire. Also check for continuity from the component to the diagnostic service probe.

Other uses for the diagnostic service probe:

- Compare voltage readings across connectors, components, or lengths of wire. This allows you to observe the operation of a circuit without the addition of jumper wires or back-probing connections. The best time to diagnose most circuits is while they are operating.
- Observe changing voltages and compare them to what the brake torque control module (BTCM) is reporting. This can be done by comparing the voltage readings of the BTCM inputs to the reported BTCM readings displayed on the portable diagnostic tool (Scan tool) or the service stall system (SSS). This can help detect damaged or faulty BTCM connections, or a faulty BTCM.

IMPORTANT: There are differences between the actual voltages from the sensors and the reported voltages by the BTCM. This is due to the internal conversion of these voltages to binary data by the BTCM. However, the voltages should generally vary together and the difference should be less than 0.2 volt.

- The diagnostic service probe can be used with future test equipment to gain access to a circuit for testing or calibration.
- The diagnostic service probe can be used to give a good ground access point. Attach a diagnostic service probe to a ground circuit and insert the multimeter lead in the probe at a ground reference. Check the ground circuit to verify the ground path is good.

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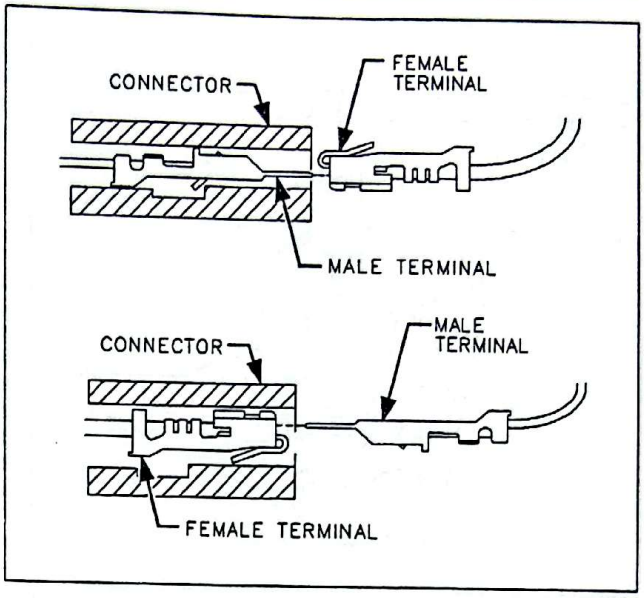
CONNECTOR JUMPER USAGE

NOTICE: Do not push multimeter probes into the connector terminals.

These devices are made of a short length of wire, a terminal, and a diagnostic service probe or an alligator clip. The terminals may be obtained from the service parts cut lead kits or from a scrap wiring harness.

They have a dual purpose. The first being to aid in measuring voltage, resistance, or current at a connector. Since diagnostic service probes are limited to use on .35, .50 and .80 mm, (22, 20 and 18 gage) thin wall wire, many of the wires cannot be probed without disconnecting the connector. But, probing the terminal could spread the contacts and damage them. Once a contact is damaged it is very difficult to make good contact with a male terminal. By constructing a jumper, the probe can make excellent contact with the circuit through the diagnostic service probe or the alligator clip, and the terminal won't be damaged.

The second function is to determine if a terminal's contacts have been spread apart, making an open or intermittent open. This is known as a terminal tightness test. Connector terminals make contact with the pin by means of a tang which is sprung against the pin. If the tang is spread apart by a meter probe, the tang will not spring back to tightly grip the pin. Test this by inserting the jumper pin and removing it, noting how well the terminal holds the pin. It should be held well enough that the pin will not fall out of the terminal.



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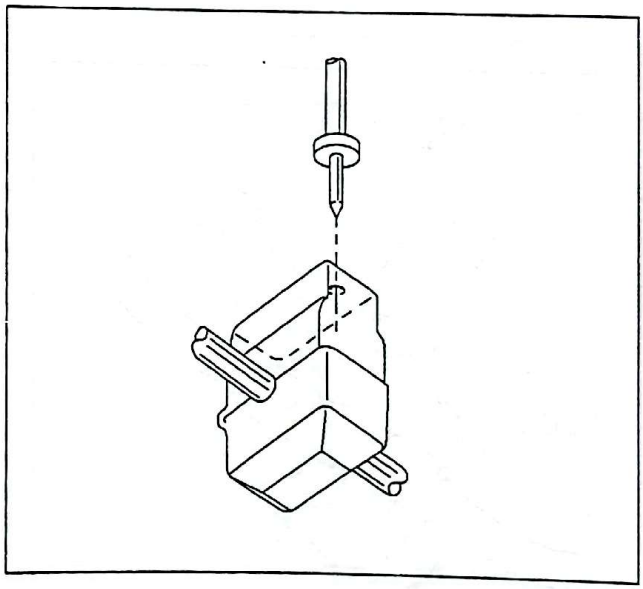

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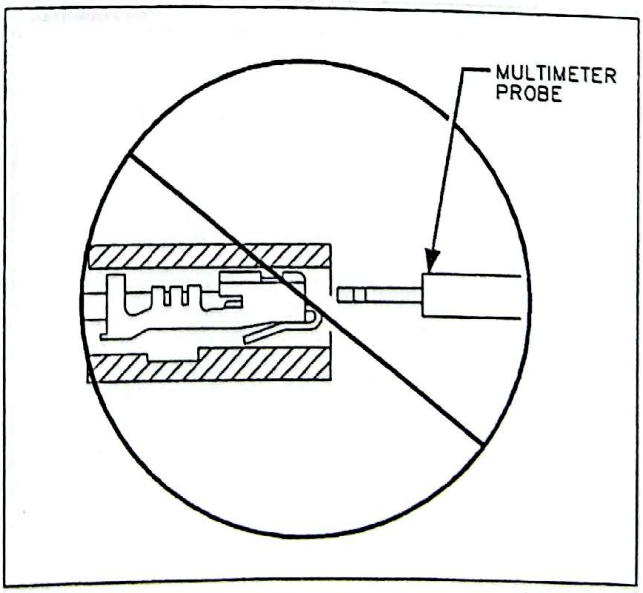

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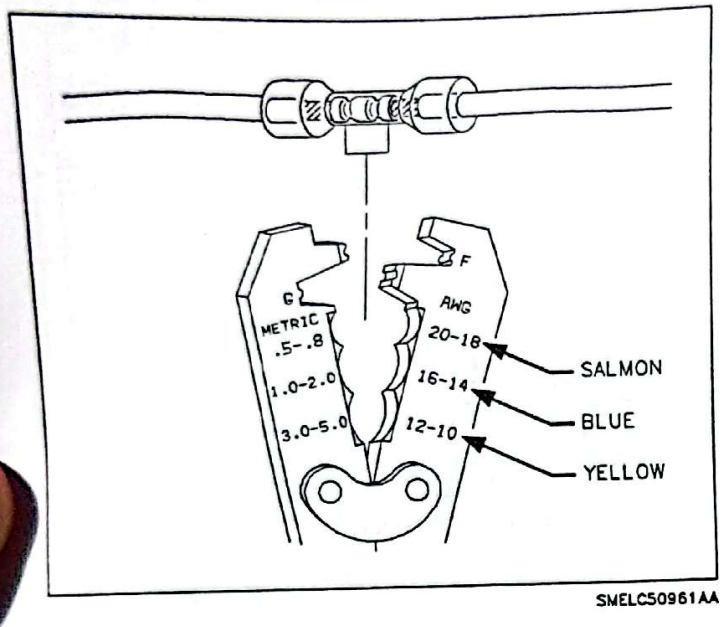

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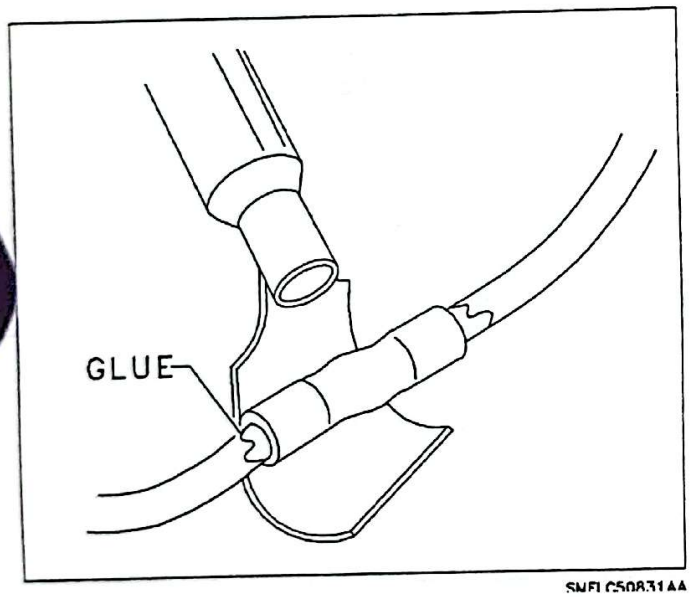

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WIRE REPAIR

SPLICING

With the low current and voltage wires in the Electric Vehicle, it is best to use approved Packard Electric Crimp and Seal Splice Sleeves (or equivalent).

1. Remove insulation from both ends, recommended strip length is 9.5 mm (3/8 in.). Caution must be used to prevent cutting the wire strands. Locate new splice a minimum of 40 mm (1.5 in.) from an outlet or other splice.
2. Determine proper sleeve for gage of wire. Position stripped ends in sleeve until wires hit stop.
3. Hand crimp using the approved crimping tool. Gently tug on wires to make sure they are secure before applying heat to them.

CAUTION: DO NOT USE MATCH OR OPEN FLAME TO APPLY HEAT TO SEAL.

4. Apply heat using Ultratorch® or some other device, heating to 175°C (347°F) until glue flows around edges of sleeve.
5. Check for continuity in the wire.

IMPORTANT: The salmon splice can be used on the .35 (22 gage) wire if the following additional steps are taken:

6. Remove 19 mm (3/4 in.) of insulation.
7. Bend the stripped portion in half to double the thickness.
8. Twist the stripped, doubled wire and insert into the splice sleeve.

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CONNECTOR REPAIR

PUSH-TO-SEAT CONNECTORS

IMPORTANT: Cut leads with terminals are available from Saturn Service Parts for terminal replacement.

TERMINAL REMOVAL

1. Remove any terminal position assurance (TPA) locks.
2. Insert the terminal lock release tool into the front of the connector cavity. Pull the wires and terminal out of the back of the connector.

CUT LEAD INSTALLATION

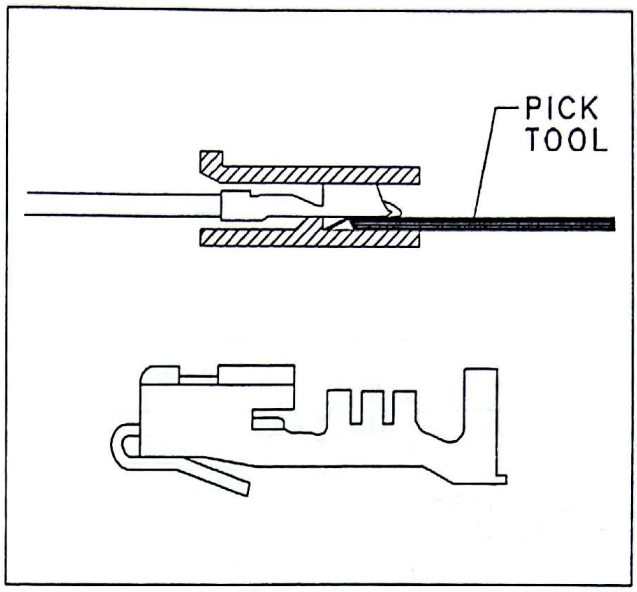
1. Put connector seal (if equipped) on wire and strip approximately 9.5 mm (3/8 in.) of insulation off the wire.
2. Remove insulation from the end of the cut lead and the harness. Recommended strip length is 9.5 mm (3/8 in.). Caution must be used to prevent cutting the wire strands.
3. Determine proper sleeve for gage of wire.

WIRE SIZE mm (GAGE)	SPLICE COLOR
.35 mm (22)	salmon (pink)
.50 mm (20)	salmon (pink)
.80 mm (18)	salmon (pink)
1.0 mm (16)	blue
2.0 mm (14)	blue
3.0 mm (12)	yellow
5.0 mm (10)	yellow

4. Position stripped ends in sleeve until wires hit the stop in the center of the splice.
5. Hand crimp using the approved crimping tool. Gently tug on wires to make sure they are secure before applying heat to them.

CAUTION: DO NOT USE MATCH OR OPEN FLAME TO APPLY HEAT TO SEAL.

6. Apply heat using Ultratorch® or some other device, heating to 175°C (347°F) until glue flows around edge of sleeve.
7. Check for continuity.
8. Insert the terminal into the connector. Check to make sure the terminal lock tab is engaged by gently tugging on the wire.
9. Replace any terminal position assurance (TPA) devices.



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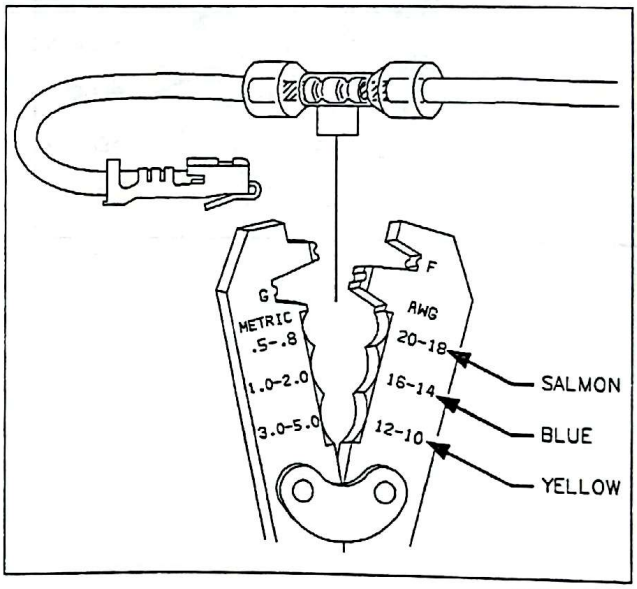

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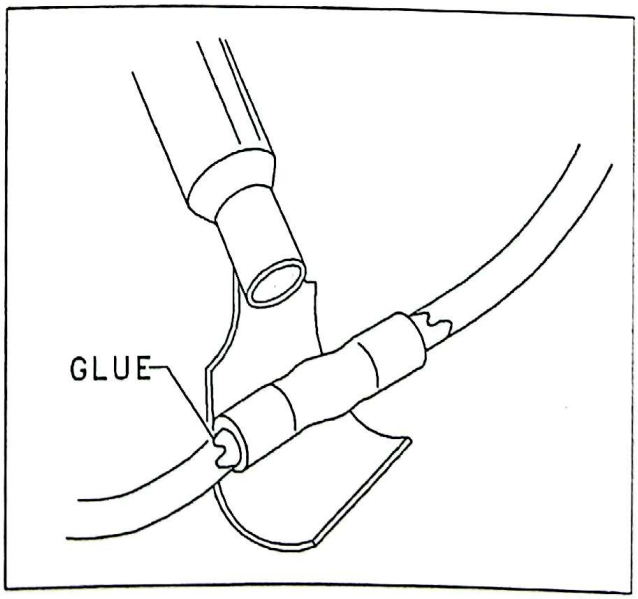

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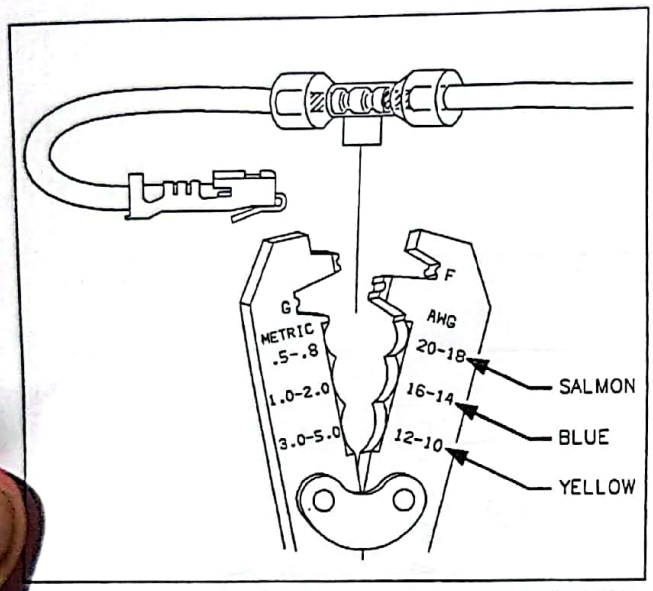
IMPORTANT: The salmon splice can be used on the .35 (22 gage) wire if the following additional steps are taken:

10. Remove 19 mm (3/4 in.) of insulation.
11. Bend the stripped portion in half to double the thickness.
12. Twist the stripped, doubled wire and insert into the splice sleeve.



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PULL-TO-SEAT CONNECTORS

TERMINAL REMOVAL

IMPORTANT: Pull-to-seat connectors repair kits are available through Saturn Service Parts. The repair kits include the connector with terminals attached to a short length of wire and crimp and seal splices. Use these kits if the pull-to-seat connector needs replacement.

1. Remove any terminal position assurance (TPA) device.
2. Grasp the lead and pull the terminal to the forward most position. Hold the lead in this stop position.
3. Insert the lock release tool into the front of the terminal cavity. A safety pin may be used for the small Metri-pack 150 series pull-to-seat terminal.
4. Depress the lock tang to unseat the terminal. Never use force to remove a terminal from a connector.
5. Push the wire and the terminal out of the connector cavity.

CUT LEAD INSTALLATION

1. Insert the wire through the connector and seat the terminal in the connector. Check to make sure the lock tab is engaged.
2. Remove insulation from the end of the cut lead and the harness. Recommended strip length is 9.5 mm (3/8 in.). Caution must be used to prevent cutting the wire strands.
3. Determine proper sleeve for gage wire from the following chart:

WIRE SIZE GAGE	.35 .5 .8 22 20 18	1.0 2.0 16 14	3.0 5.0 12 10
Part Number*			
12089189 (217670)	**–Salmon–**		
12089190 (217671)		**–Blue–**	
12089191 (217672)			**–Yellow–**

* Part of Saturn Electrical Tool Kit.

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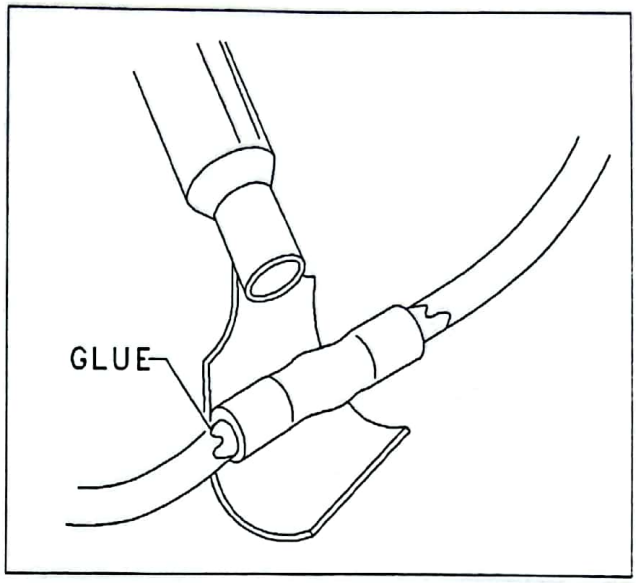
4. Position stripped ends in sleeve until wires hit the top in the center of the splice.
5. Hand crimp using the approved crimping tool. Gently tug on wires to make sure they are secure before applying heat to them.

CAUTION: DO NOT USE MATCH OR OPEN FLAME TO APPLY HEAT TO SEAL.

6. Apply heat using Ultratorch® or some other device, heating to 175°C (347°F) until glue flows around edges of sleeve.

IMPORTANT: The salmon splice can be used on the .35 (22 gage) wire if the following additional steps are taken:

7. Remove 19 mm (3/4 in.) of insulation.
8. Bend the stripped portion in half to double the thickness.
9. Twist the stripped, doubled wire and insert into the splice sleeve.



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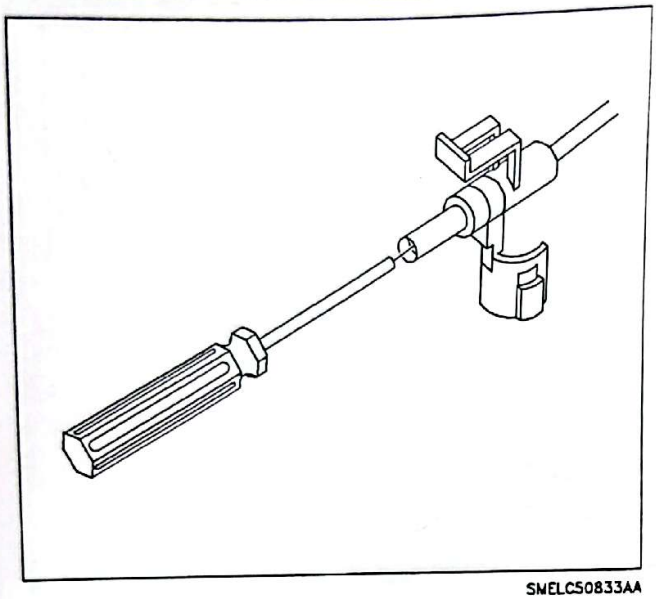

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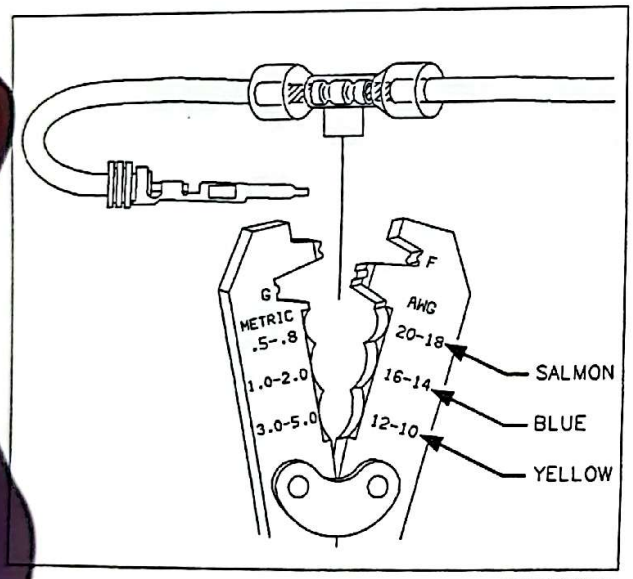

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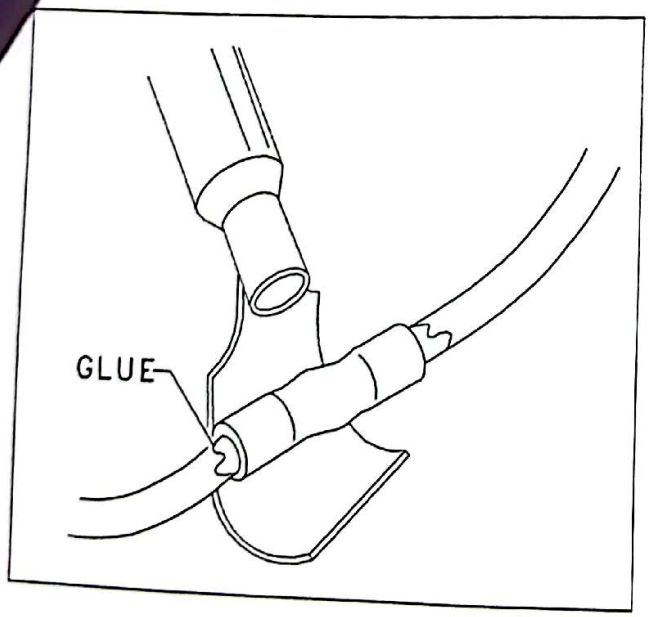

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WEATHER PACK CONNECTORS

TERMINAL REMOVAL

1. Remove any terminal position assurance (TPA) devices.
2. Insert the weather pack removal tool into the front of the terminal cavity.

CUT LEAD INSTALLATION

1. Put connector seal on wire and strip approximately 9.5 mm (3/8 in.) off the wire. Caution must be used to prevent cutting the wire strands.
2. Remove insulation from the end of the cut lead and the harness. Recommended strip length is 9.5 mm (3/8 in.). Caution must be used to prevent cutting the wire strands.
3. Determine proper sleeve for gage wire from the following chart:

WIRE SIZE GAGE	.35 .5 .8 22 20 18	1.0 2.0 16 14	3.0 5.0 12 10
Part Number*			
12089189 (217670)	**–Salmon–**		
12089190 (217671)		**–Blue–**	
12089191 (217672)			**–Yellow–**

* Part of Saturn Electrical Tool Kit.

4. Position stripped ends in sleeve until wires hit the stop in the center of the splice.
5. Hand crimp using the approved crimping tool. Gently tug on wires to make sure they are secure before applying heat.

CAUTION: DO NOT USE MATCH OR OPEN FLAME TO APPLY HEAT TO SEAL.

6. Apply heat using Ultratorch® or some other device, heating to 175°C (347°F) until glue flows around edges of sleeve.
7. Check for continuity.
8. Insert the terminal into the connector. Check to make sure the terminal lock tab is engaged by gently tugging on the wire.
9. Replace any terminal position assurance (TPA) devices.

IMPORTANT: The salmon splice can be used on the .35 (22 gage) wire if the following additional steps are taken:

10. Remove 19 mm (3/4 in.) of insulation.
11. Bend the stripped portion in half to double the thickness.
12. Twist the stripped, doubled wire and insert into the splice sleeve.

POWER DISTRIBUTION

GENERAL DESCRIPTION

SIR SYSTEM

Refer to "Disabling and Enabling the SIR System" in the front of this manual.

RUN1/RUN2 CIRCUIT OPERATION

Conventional vehicles use a switch to control power-up of the electrical system, commonly known as an ignition switch. The EV1 uses a different system to control power-up of the electrical system. The control used by the EV1 is known as the key pad, located in the RUN/LOCK SHIFTER ASSEMBLY (RSA). The operator enters a valid key code into the key pad and depresses RUN. The RSA pulls the RUN1 and RUN2 command lines "low", sending a command to the power moding module. The power moding module receives the command and powers-up the vehicles electrical system.

The power moding module, located in the RH junction block operates very similar to a relay, a device well known in the automotive industry today. The power moding module receives a "low" signal from the RSA similar to the "Control" side of a relay. After the signal is received the module then switches and supplies RUN1 and RUN2 voltage similar to the "Load" side of a relay.

RUN1 is the 12 volt supply for low voltage components and RUN2 is the 12 volt supply that controls the high voltage components. During power-up if there is a high voltage system problem, the battery pack control module (BPM) will identify the subsystem and set a diagnostic trouble code (DTC) along with sending a serial data message to the RSA disabling RUN 2. If a high voltage system problem is identified by the BPM during a drive cycle, RUN 2 will be disabled after the vehicle is below 1 km/h.

VEHICLE "WAKE-UP COMMAND" AND "RUN 1/WAKE-UP" DURING CHARGING

When the charged coupler is inserted into the charge receptacle the charge receptacle sends a wake-up command on the WAKE-UP COMMAND line to the battery pack module (BPM) for 1.25 seconds. After the command is received, the BPM then wakes-up for 3.0 seconds and sends out its own command on the same WAKE-UP line to the heat pump thermal control module (HTCM). The HTCM wakes-up and continues to hold the WAKE-UP COMMAND line is an input to the power moding module (located in the RH junction block).

When the power moding module sees the WAKE-UP line "High", this supplies power to cooling system components allowing the cooling system to function during charge events.

PERIODIC WAKE-UP

The HTCM will send a wake-up command on the WAKE-UP COMMAND line to the BPM every six hours, the BPM will then wake-up to check the state of the auxiliary battery. If the auxiliary battery has a low state of charge the BPM will command the accessory A/C and D/C power module (APM) to wake-up and charge the auxiliary battery for fifteen minutes. If the auxiliary battery state of charge is within the acceptable parameters the HTCM and BPM will go back to sleep.

HOW TO USE THIS SECTION OF THE MANUAL

The first part of this section provides:

- A general description of the type of circuits.
- Explain the types of protection devices and junctions blocks (fuse blocks).
- List the types of bulbs and fuses.

The second part of this section provides:

- Clean and simple electrical circuit schematics
- A graphic overview of the circuit shown on the schematic
- Trouble trees for troubleshooting an electrical problem and diagnosis information.

NOTE: Diagnosis follows some of the following sub-system schematics. If the diagnosis for that particular sub-system is not included in this section, it can be found in the appropriate service manual sections.

- General description of the circuit.

CIRCUITS

Automotive circuits are divided into three categories: power, signal (control or data), and ground circuits.

POWER CIRCUITS

Power circuits are classified as those cables that provide battery or mechanically switched battery voltages to electrical loads. Some examples of these circuits are:

- Run1 circuits – 41A, 41B, 41C
- Auxiliary Battery circuits – 1A, 1B, 1C
- Headlamp circuits – 142A, 342A
- Defog circuits – 1342B, 1242B

SIGNAL (CONTROL OR DATA) CIRCUITS

Signal circuits are classified as those cables that provide signal voltages from one electrical device to another device. Examples of these signals and devices are:

- Power window switch to junction block 166, 167.
- Instrument panel cluster to telltale bank – 30A, 2029,1084, 2019

Signal wires are usually current limited by one of the devices that is attached to the wire. In the above examples

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the junction block and instrument panel cluster (IPC) fuel gage limit the current in these circuits through the use of electronics (pull up or pull down resistors, transistors, etc.). Signal wire current levels for short circuit conditions normally do not exceed operating levels by an appreciable amount.

GROUND CIRCUITS

Ground circuits are classified as those circuits that provide a ground (zero voltage level with reference to the battery) to the electrical system. Examples of these circuits are:

- Chassis ground – 350A, 350B, 35C
- PCM ground – 450P, 450R

Since ground circuits are already *shorted* to ground, the current level is based on the electrical load resistance. Like signal circuits, ground circuit cable selection is a function of operating current.

PROTECTION DEVICES

Circuit protection devices such as a maxifuse or a positive temperature coefficient (PTC) devices are utilized to protect the electrical system in case of an electrical short. The purpose of circuit protection is to protect the wiring assembly during normal operation and overload conditions. An overload occurs if too much current is flowing through a wire or device. This may occur as a result of a short to ground, voltage or overloaded components the short circuit could be caused by a pinched or cut wire or an internal device short circuit, such as an electronic module failure.

The primary intent of circuit protection is to protect the wiring assembly, and not the load at the end of the assembly. In some cases, load protection can also be accomplished at the same time.

For example, if an electronic module short circuits, the circuit protection device will assure minimum degradation to the wiring assembly, but will not necessarily prevent damage to the module. The EV1 uses two types of circuit protection devices, the first being maxifuses and the second being PTCs. The maxifuses protect the power distribution part of the wiring harness and the PTCs protect the part of the wiring harness that feeds all the sub-system components. PTCs are not replaceable separately. If a PTC is found to be defective the junction block that contains the PTC must be replaced as an assembly.

POSITIVE TEMPERATURE COEFFICIENTS (PTC)

PTCs are circuit protection devices very similar to circuit breakers. The difference being, circuit breakers are designed to open in a high-current situation such as circuit overloads or a short-to-ground. In a PTC, as circuit overloads occur the material in the PTC heats up and increases in resistance. The higher the current, the higher the temperature and resistance of the PTC, until the current flow is limited to a safe level; therefore, protecting the wiring in the vehicle.

After the corrective action has been taken to repair the high current condition the PTC will return to its normal state automatically after it cools down. In some cases battery voltage will need to be removed from the circuit in order for the PTC to return to its normal state, depending on the in rush of that sub-system during normal operation. PTC resistance values are very low similar to a fuse, thus not effecting circuit operation. After a PTC has been "tripped" or the resistance is very high a small amount of current will be flowing in the circuit, unlike a blown fuse or circuit breaker that has been "tripped" where there is no current flowing. If a PTC does not return to its normal state after the repair, remove battery voltage from the circuit it insure the circuit in rush is not keeping the PTC in the "tripped" state.

MAXIFUSES

The maxifuse is a relatively new circuit protection device that is designed to be a serviceable replacement for the fusible link cables previously used in the automotive industry.

It operates very similar to a mini fused used in conventional vehicles except the current carrying capabilities are much higher. Maxifuses are available in 20–60 ratings. The blow characteristics have been designed to match cable temperature cures for overload conditions. All maxifuses are located underhood in the LH and RH maxifuse blocks.

PARASITIC LOADS

Small current drains called parasitic loads constantly draw current from the auxiliary battery when the key pad is in the OFF mode. Normal parasitic draws are from the devices in the vehicle that require constant power to retain memory such as the clock, propulsion control module (PCM), brake torque control module (BTCM). Depending on auxiliary battery state of charge parasitic loads can discharge the auxiliary battery when the vehicle is not in use for long periods of time, this would be considered normal.

High parasitic loads will discharge the auxiliary battery at a much faster rate, it may be as fast as overnight. High parasitic conditions can be caused from added equipment such as cellular phones that have been left On, radar detectors, alarm systems, etc. These types of things should be looked at first. If there is no added equipment to the vehicle and the vehicle is suspected to have high parasitic. perform the following "Parasitic Load Test."

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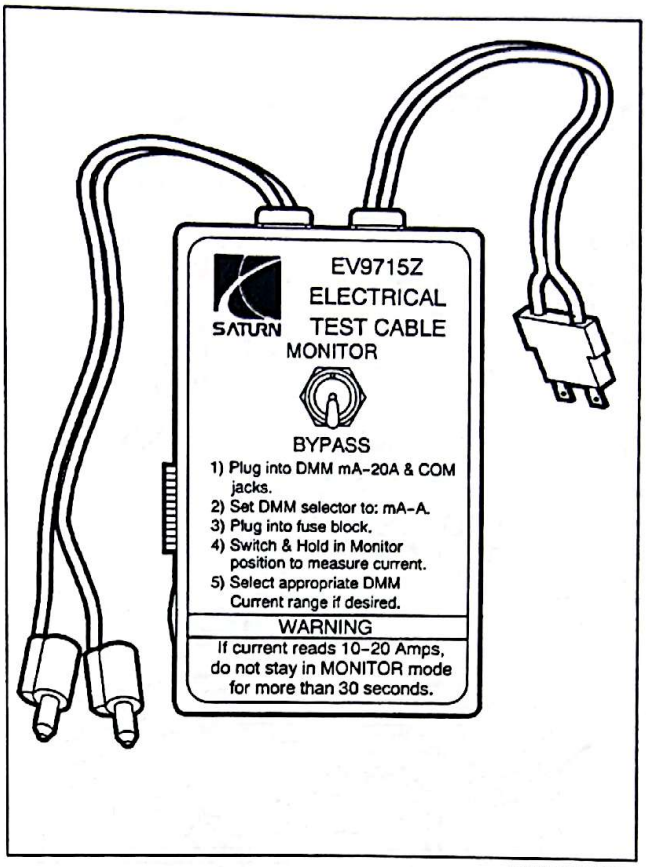
PARASITIC LOAD TEST

NOTICE: The normal parasitic load on the EV1 is approximently 10mA to 15mA. If the draw is over 10A the DVM may be damaged. To prevent this situation make sure the key pad is in the LOCK mode, Retained Accessory Power is not active and all accessories are Off while performing this test.

1. Remove the 60 amp maxifuse located in the negative auxiliary battery cable.
2. Install maxifuse connector of the parasitic load tool EV9715Z, into the inline fuse holder of the negative auxiliary battery cable.
3. Connect DVM EV 9712Z to parasitic load tool using the A and COM jacks and place the meter on the mA\A scale.
4. Wait 60 seconds and place the switch on the parasitic load tool to the "Monitor" position. Hold the switch until the reading is recorded.
   - If the amperage is below 25 mA, refer to "Battery and Charging System" section in the service manual.
   - If the amperage is above 25 mA there is a high parasitic draw. Continue to step 5.
5. Remove the maxifuse connector on the parasitic load tool from the auxiliary battery ground cable (60 amp. maxifuse holder). Reinstall 60 amp. maxifuse.
6. After the all obvious causes have been checked (something jammed in the power outlet, interior lighting on, etc.), make sure all accessories are Off. Remove the right hand or left hand maxifuse cover. Remove one fuse at a time, placing the parasitic tool in the open fuse location and place it in the "Monitor" position.
   - If the draw is over 25 mA, this is the circuit with the high parasitic load.
   - If the amperage is below 25 mA test all the underhood maxifuses until you find the circuit with the high parasitic load (above 25 mA).
7. After the circuit has been identified, start removing components on that circuit until the draw has been located. If the draw still exists after all components are removed from that circuit, there must be a grounded wire (a resistance short) causing the draw. Using the schematics for that circuit, locate damaged wire and repair as necessary.
8. Recheck the overall parasitic draw after the repair has been made to ensure the problem has been repaired.



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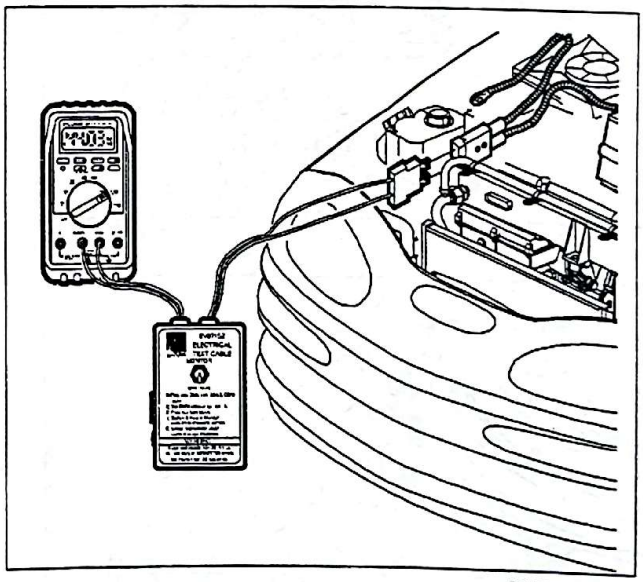

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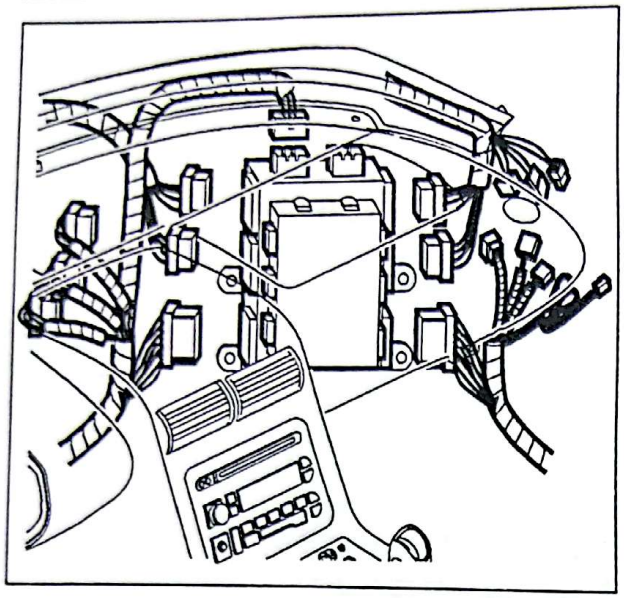
JUNCTION BLOCKS



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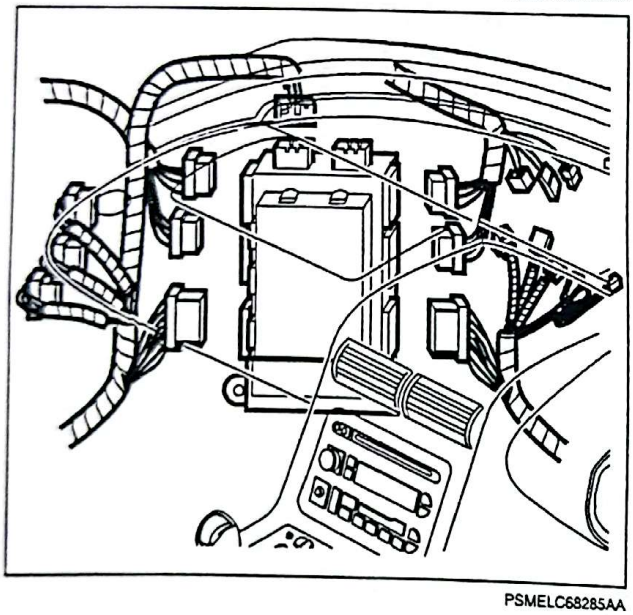

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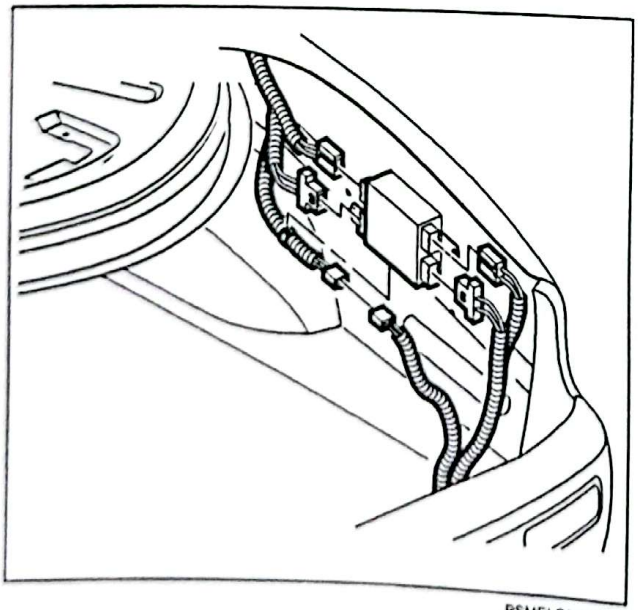

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The power and ground distribution system used on EV1 incorporates junction blocks to help remove complexity from the wiring assemblies and to provide central locations for circuit protection devices and relays.

With the advances in automotive electronics over the past few years, the size and complexity of wiring harnesses has increased. The use of junction blocks helps to reduce the complexity while also reducing cost and mass. This is accomplished by reducing the number of cut leads, sealed inline connectors and sealed splices (for underhood applications), and the reduction in the bundle size of wiring harnesses.

The EV1 has three junction blocks.

Right hand junction block (RHJB), located in the passenger compartment, under right side of I/P, attached to front of dash.

Left hand juncton block (LHJB) located in the passenger compartment under the left side of I/P attached to front of dash.

Trunk junction block (TJB), located in the trunk compartment attached to the right side under carpet.

These junction blocks provide a home for relays, positive temperature coefficient (PTC's) and electronic modules also providing a central ground point, using case ground eliminating the need for serparate connections and mounting attachments. This design also provides a central connection point for the major harnesses in the vehicle.

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FUSE BLOCK DETAILS

UNDERHOOD FUSE BLOCK #1

FUSE	AMPERAGE RATING	FUSED CIRCUITS	PAGE
REG FAN	20	Cigar/DLC Fuse, Radio Fuse, Courtesy Fuse, HI Cooling Fan Relay	
	20	Horn Fuse, CNTL Fuse, BLWR Fan Fuse, HI CL PMP Fuse	
FRONT BRAKE	20	ABS Front Brake Enable Relay	
BRAKE REAR	20	ABS Rear Brake Enable Relay	
	20	LH HDLP LO Fuse, LH HDLP HI Fuse, LWDO Fuse, Stop Fuse	
	20	RH HDLP LO Fuse, FH HDLP HI Fuse, RWDO Fuse, Run #2 CNTL Fuse, I/P Electrical	
	20	I/P Relay Center, B–U LP Fuse, DR Lock/Mir Fuse, Trailering Fuse	
DEFOG	20	RR Defog Fuse, LR Defog Fuse	

UNDERHOOD FUSE BLOCK #2

FUSE	AMPERAGE RATING	FUSED CIRCUITS	PAGE
	20	LO Cooling Fan Relay	
HVAC	20	LO CL PMP Fuse, REV VLV Fuse	
	20	Hazard Fuse, Oil PMP Fuse, Charge/Relay Fuse	

CIRCUIT AND CAVITY LOCATION

UNDERHOOD FUSE BLOCK #1				UNDERHOOD FUSE BLOCK #1			
CAVITY	CIRCUIT	CAVITY	CIRCUIT	CAVITY	CIRCUIT	CAVITY	CIRCUIT
A1	342	B1	REGULATED BATTERY	A1	4	B1	REGULATED BATTERY
A2	442	B2		A2	142	B2	
A3	542	B3		A3	242	B3	
A4	642	B4	1	A4		B4	3
A5	742	B5		A5		B5	
A6	842	B6		A6		B6	
A7	1042	B7		A7		B7	
A8	1142	B8		A8		B8	

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ELECTRICAL CIRCUITS

CIRCUIT SCHEMATICS

The circuit schematics show the circuits and components that are covered in that particular system. By eliminating circuits and components not related to the system being covered, the circuit schematics are greatly simplified.

Circuit schematics provide a description of how a circuit is provided voltage, what the current path is to the components, and how the circuit is grounded.

Each wiring schematic is identified by circuit number, size (in mm) and color. Wire colors are shown in the abbreviated form.

On the facing page is a schematic legend. This legend explains what is shown on the electrical schematic. It is important to realize that no attempt is made to represent components, and wiring as they physically appear on the vehicle. For example, a four-foot length of wire is treated no differently in a schematic from one which is a few inches long.

DIAGNOSIS

Before beginning any diagnosis, there are several important steps that should be taken:

Verify the Problem

Operate the system and list symptoms in order to:

- Check the accuracy and completeness of the concern.
- Learn more what might give a clue to the nature and location of the problem.
- Analyze what parts of the system are working.

Check the Circuit Schematic

Refer to the circuit schematic for clues to the concern. Location and identification of circuit components may give some idea of where the problem is.

The circuit schematics are designated to make it easy to identify common points in circuits. This knowledge can help narrow the problem to a specific area. For example, if several circuits fail at the same time, check for a common voltage or ground connection. If part of a circuit fails, check the connections between the part that works and the part that does not work.

Cause-to-Complaint Charts

Refer to the Cause-to-Complaint charts located after the graphic overview. This chart lists the types of problems that may be encountered in an electrical circuit and the possible fix. The chart will then refer you to the correct diagnosis step. Use the electrical schematic along with the diagnosis steps to help in troubleshooting.

Graphic Overview

Graphic overview illustrations are shown for each circuit. These illustrations can be used to help locate a component and/or connector while diagnosing.

General Description

The general description, describes how the circuit operates, when the circuit operates and how the components interact to make a complete circuit.

Connector Views

At the back of this manual, connector views are shown. These illustrations show all of the connectors used in the vehicle. These views can be used to help show what the connector looks like and where a particular terminal in the connector is located.

Make the Repair

Repair the problem circuit as described in the "Electrical Trouble Shooting" section of this service manual.

Verify that the Repair is Complete

Operate the system and check that the repair has removed all symptoms, and also has not caused any new symptoms.

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SUB-SYSTEM SCHEMATICS

NOTE: Diagnosis follows some of the following sub-system schematics. If the diagnosis for that particular sub-system is not included in this section, it can be found in the appropriate service manual sections.

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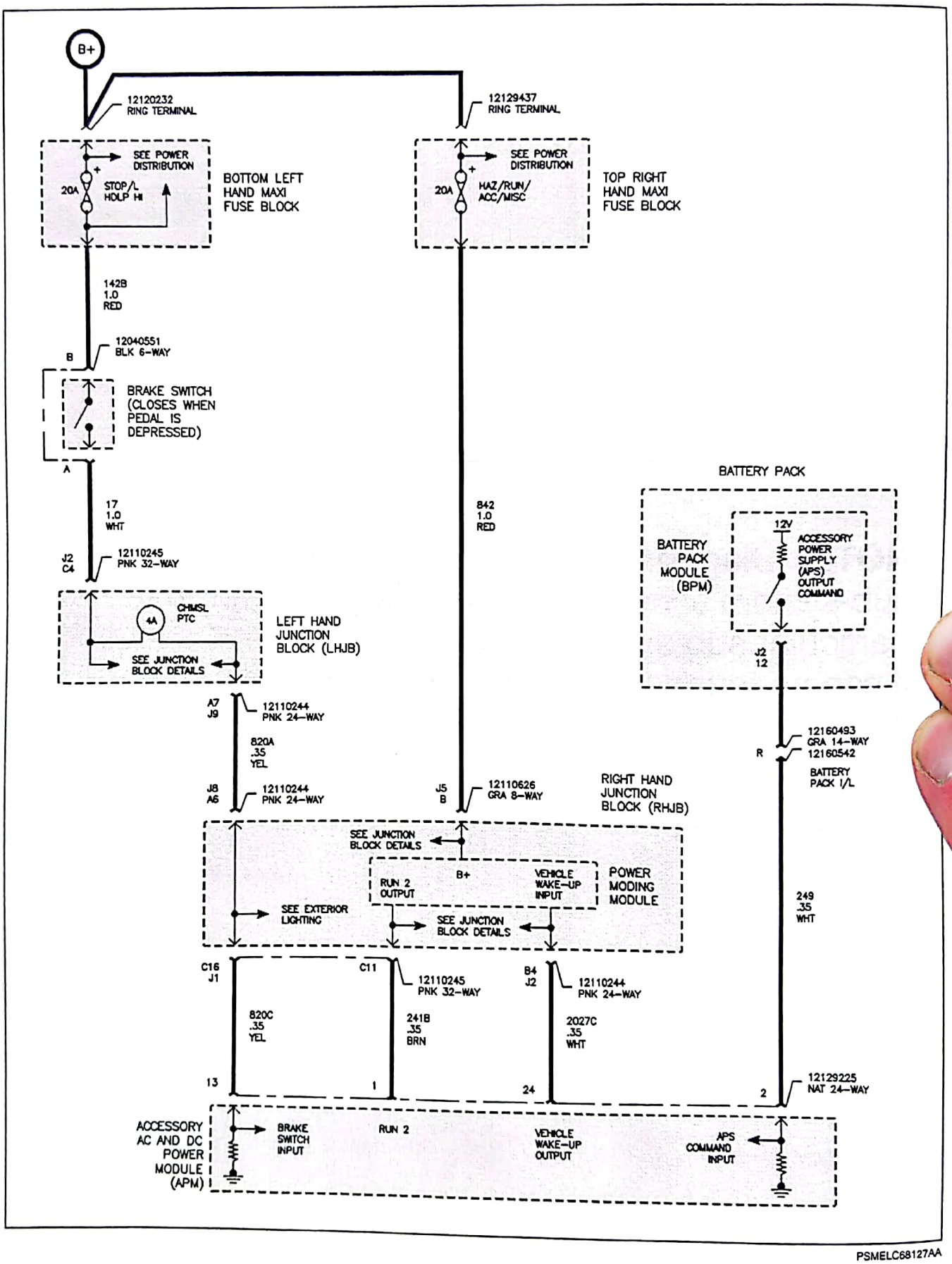
ACCESSORY AC AND DC POWER MODULE



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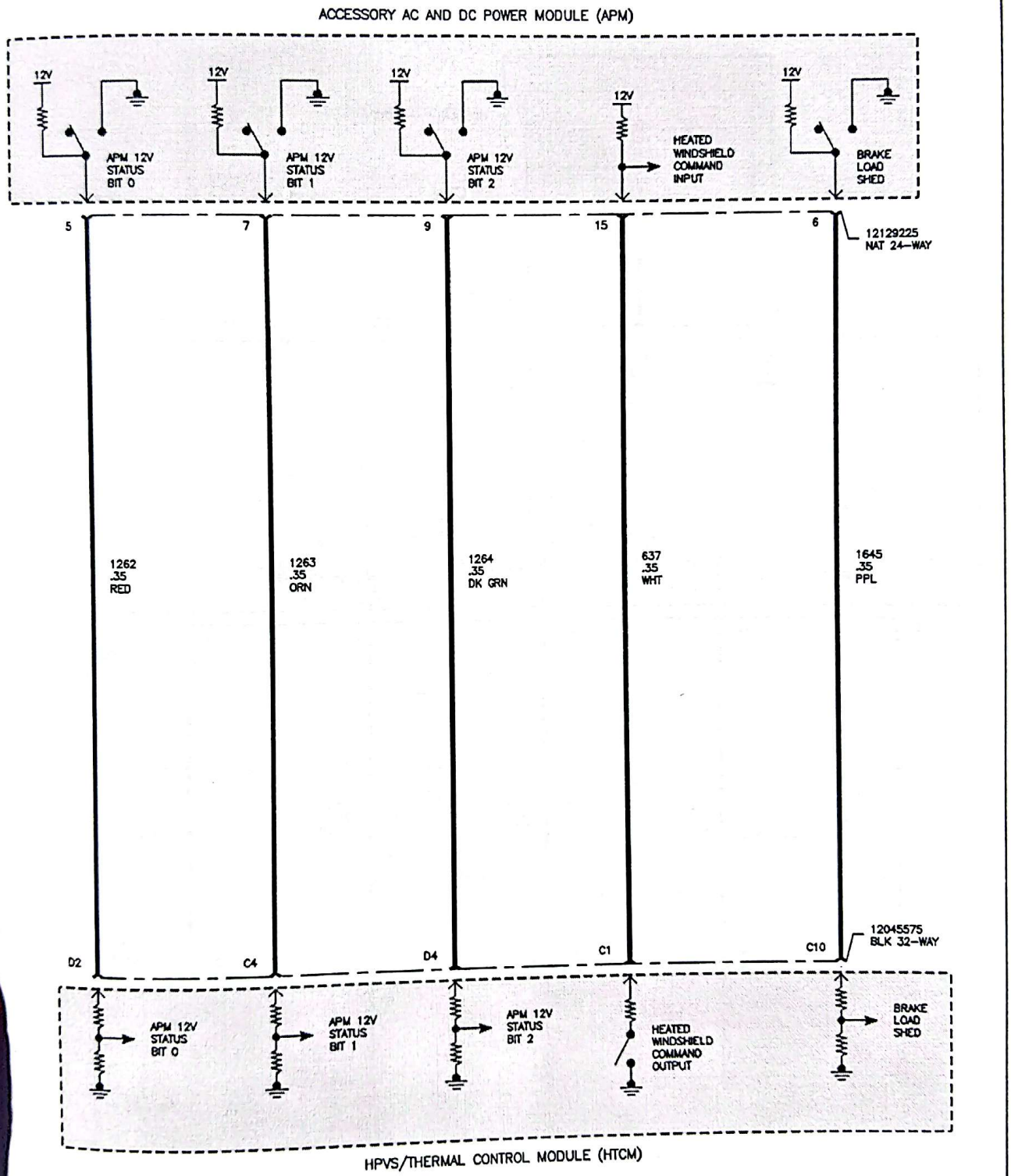

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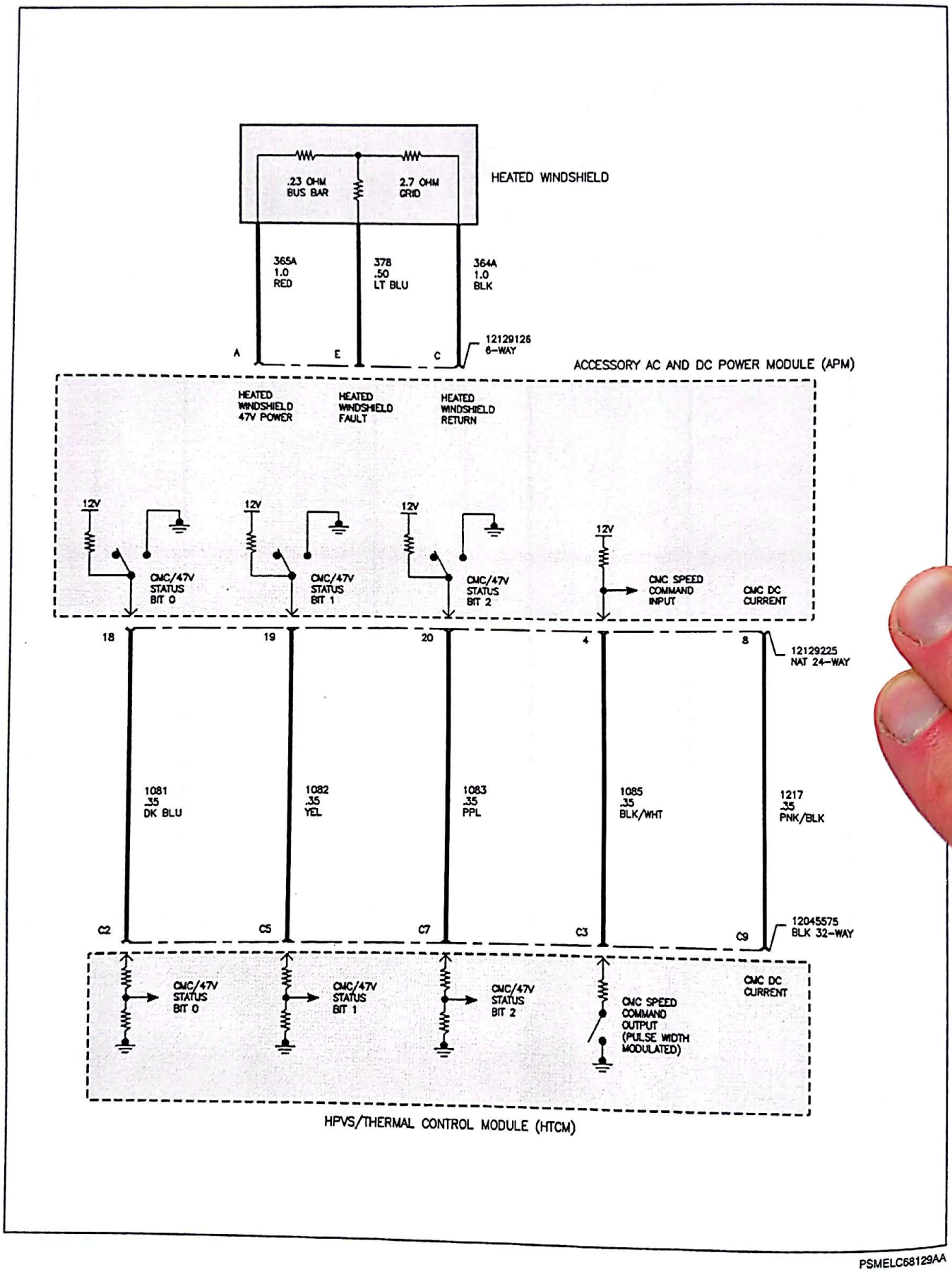

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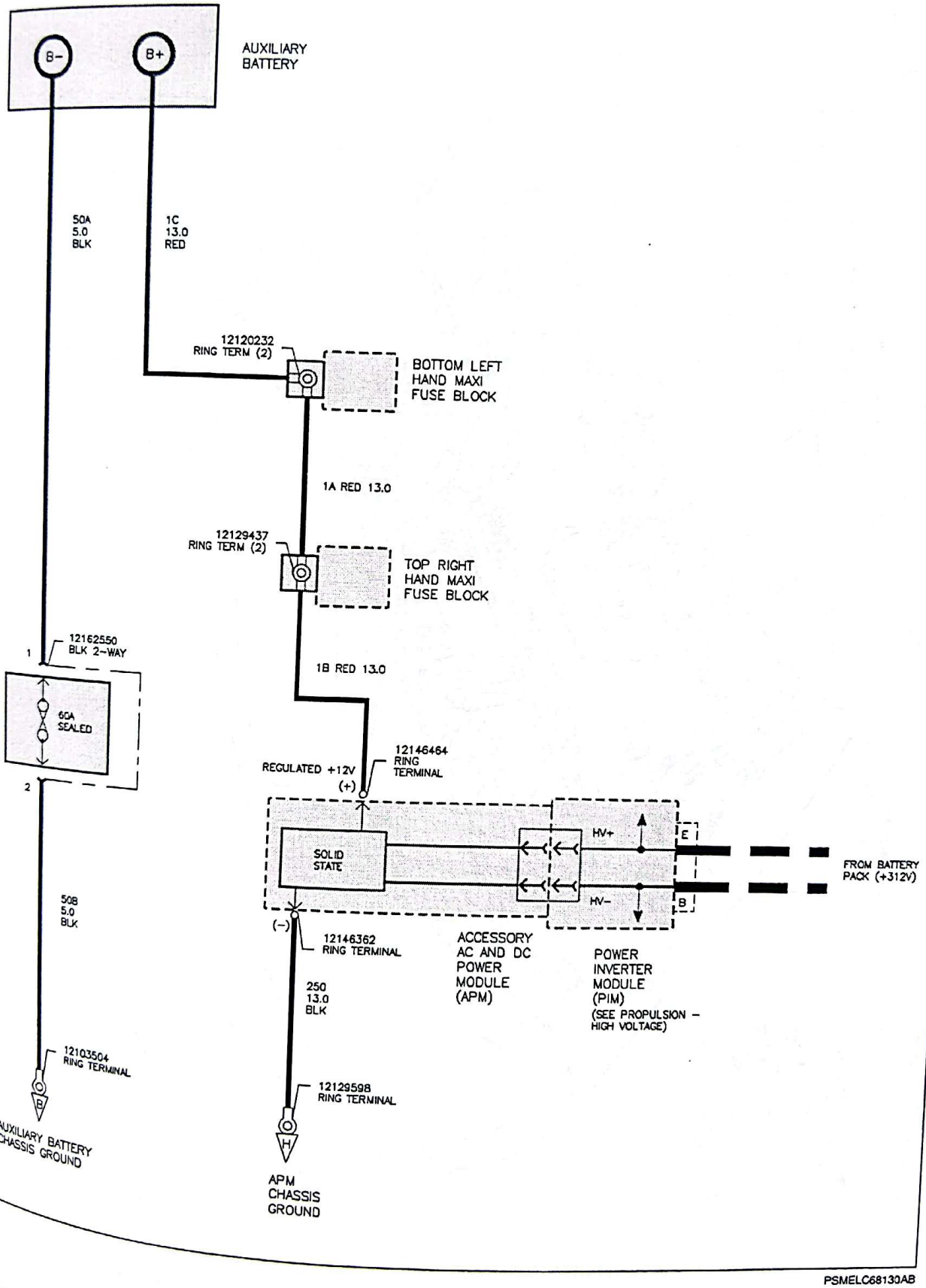
B-
B+
AUXILIARY BATTERY
50A 5.0 BLK
1C 13.0 RED
12120232 RING TERM (2)
BOTTOM LEFT HAND MAXI FUSE BLOCK
1A RED 13.0
12129437 RING TERM (2)
TOP RIGHT HAND MAXI FUSE BLOCK
1B RED 13.0
1
12162550 BLK 2-WAY
60A SEALED
2
REGULATED +12V (+)
12146464 RING TERMINAL
SOLID STATE
HV+
HV-
E
B
FROM BATTERY PACK (+312V)
(-)
12146362 RING TERMINAL
ACCESSORY AC AND DC POWER MODULE (APM)
POWER INVERTER MODULE (PIM)
(SEE PROPULSION - HIGH VOLTAGE)
50B 5.0 BLK
250 13.0 BLK
12103504 RING TERMINAL
B
AUXILIARY BATTERY CHASSIS GROUND
12129598 RING TERMINAL
H
APM CHASSIS GROUND
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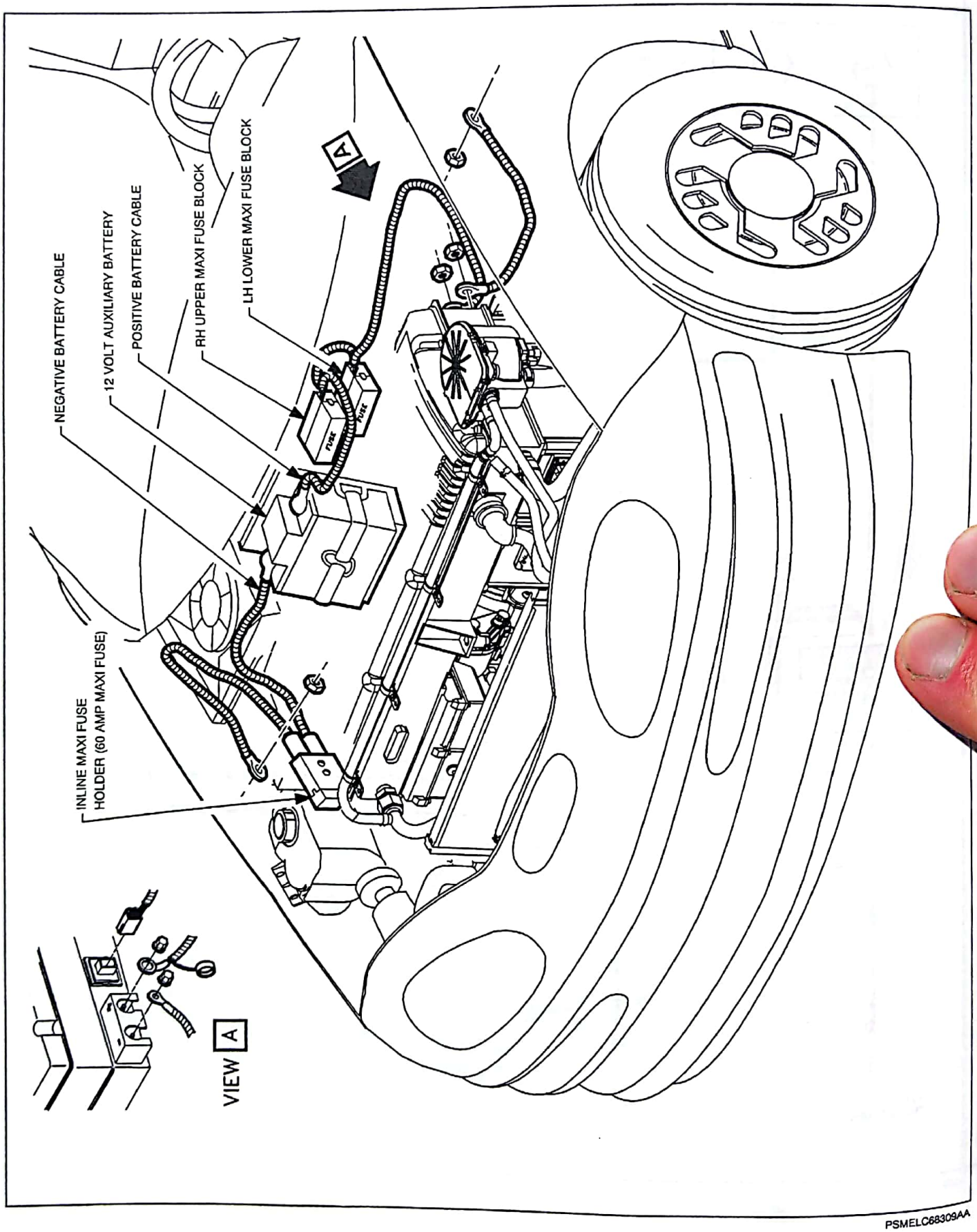
ACCESSORY AC AND DC POWER MODULE COMPONENT LOCATION VIEW



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NOTES

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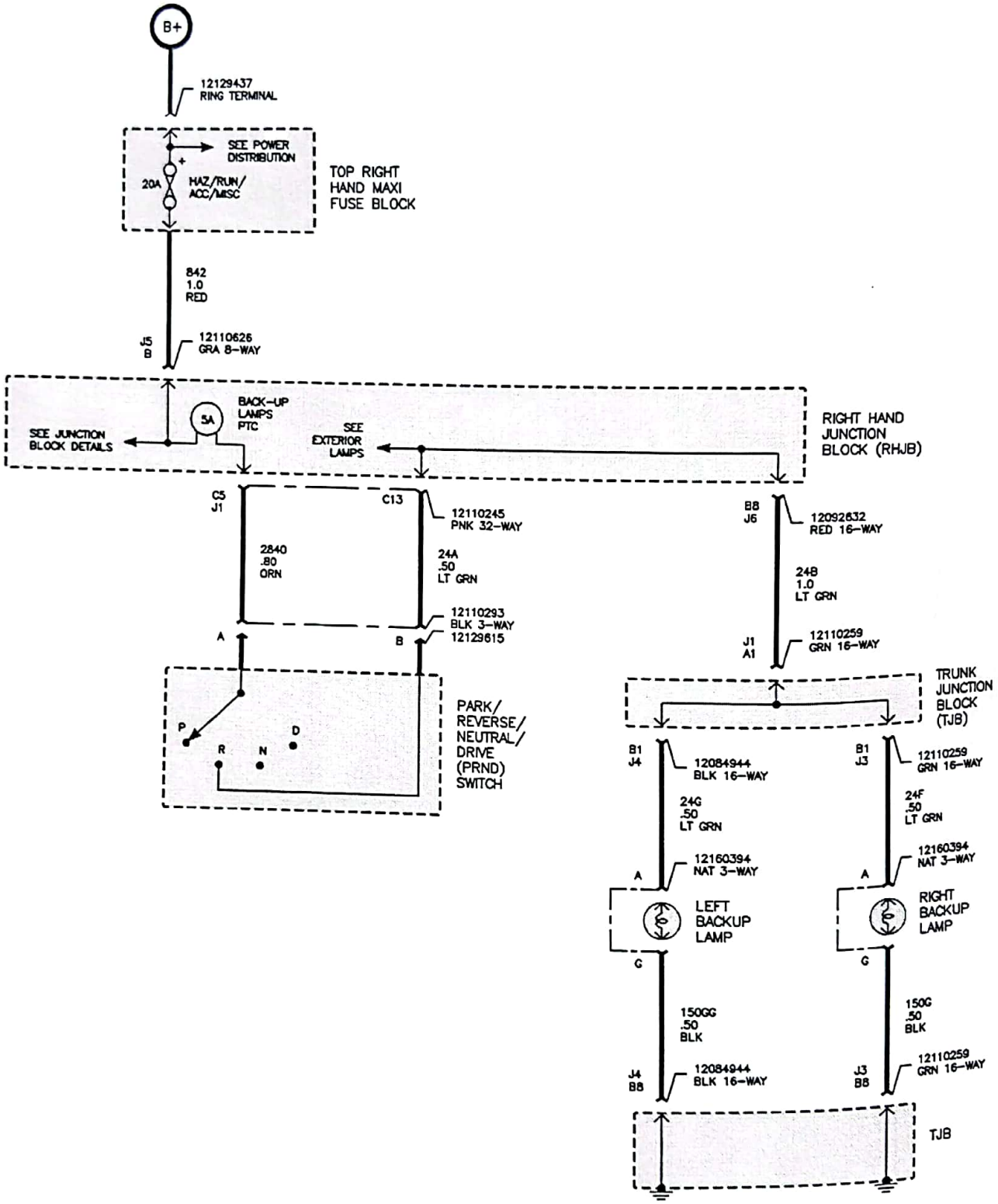
BACKUP LAMPS



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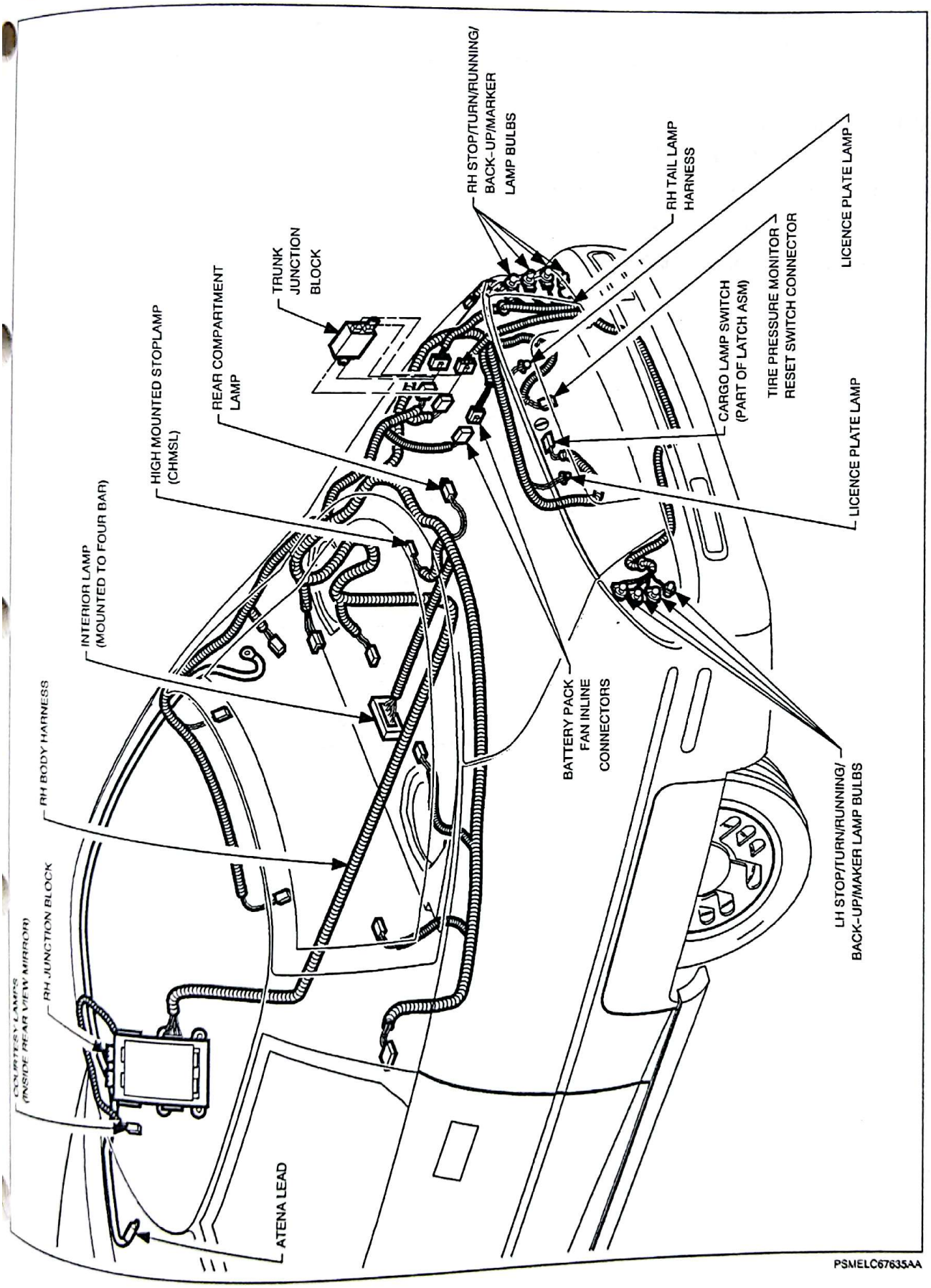
BACKUP LAMPS COMPONENT LOCATION



BACKUP LAMPS

The backup lamps should both come On whenever the shifter is put in reverse. The backup lamps receive power from a five amp positive thermal coefficient (PTC) in the right hand junction block (RHJB). This power travels through the PRND switch, the RHJB, the trunk junction block (TJB), and finally to the backup lamp bulbs. They receive ground through the TJB.

BACKUP LAMPS TROUBLE TREE INDEX

- Chart 1 – Left Hand Backup Light Inoperative Only
- Chart 2 – Right Hand Backup Light Inoperative Only
- Chart 3 – Backup Lamps Both Inoperative
- Chart 4 – Backup Lamps On All the Time

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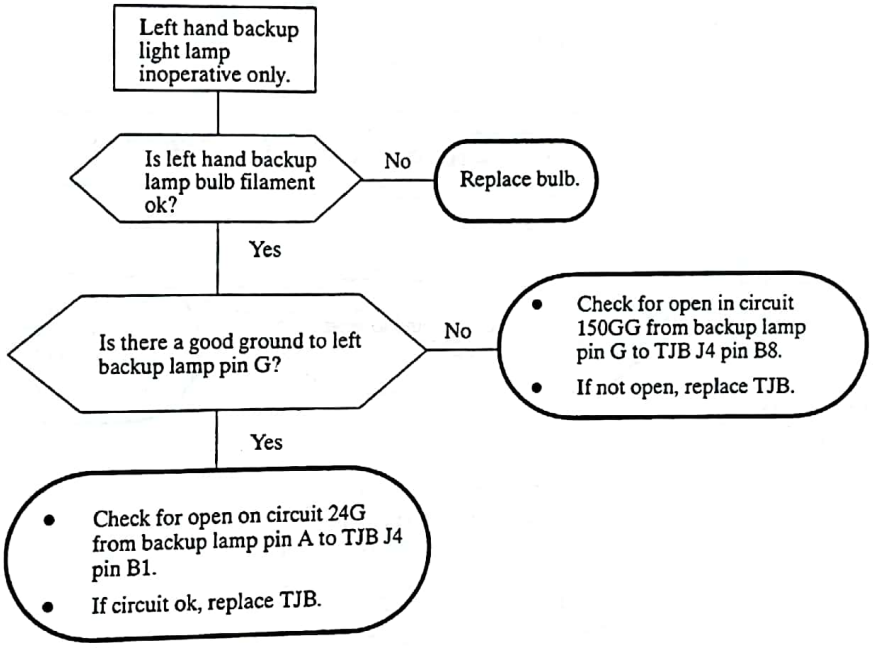
LEFT HAND BACKUP LIGHT INOPERATIVE ONLY

CHART 1



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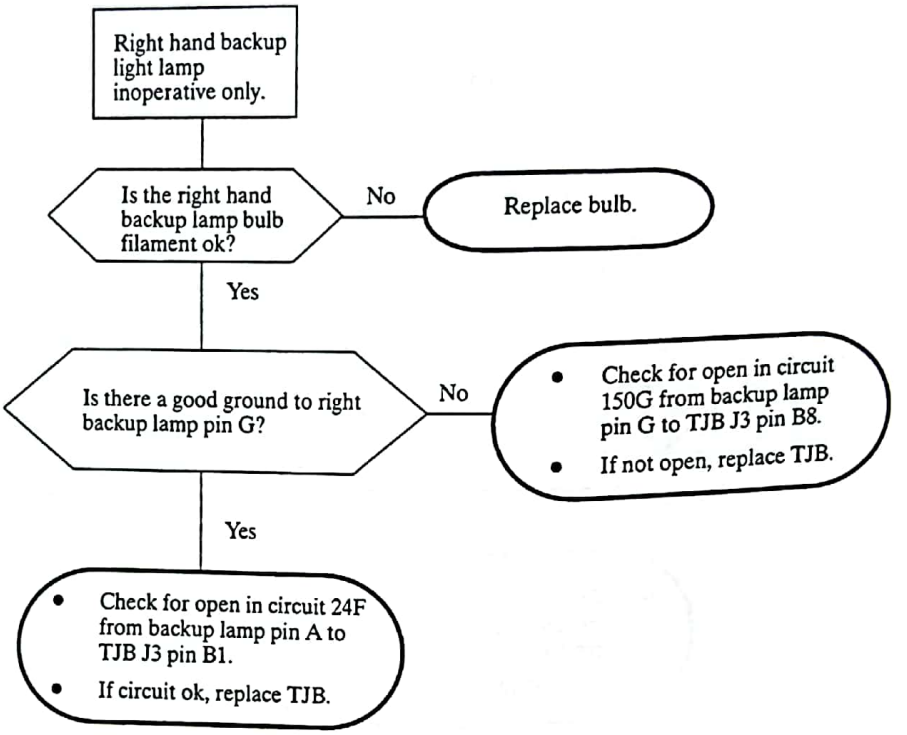
RIGHT HAND BACKUP LIGHT INOPERATIVE ONLY

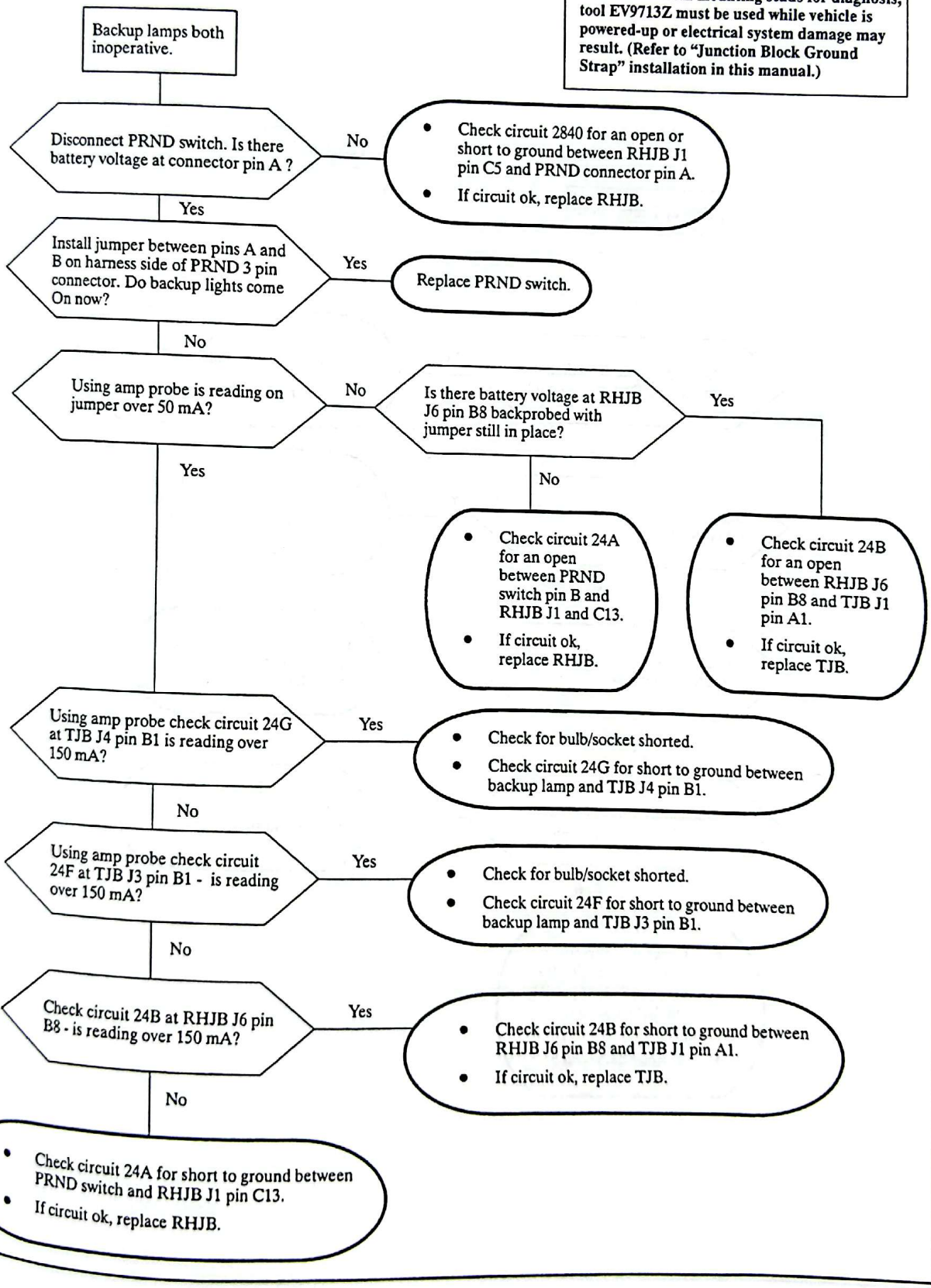
CHART 2



BACKUP LAMPS BOTH INOPERATIVE

CHART 3

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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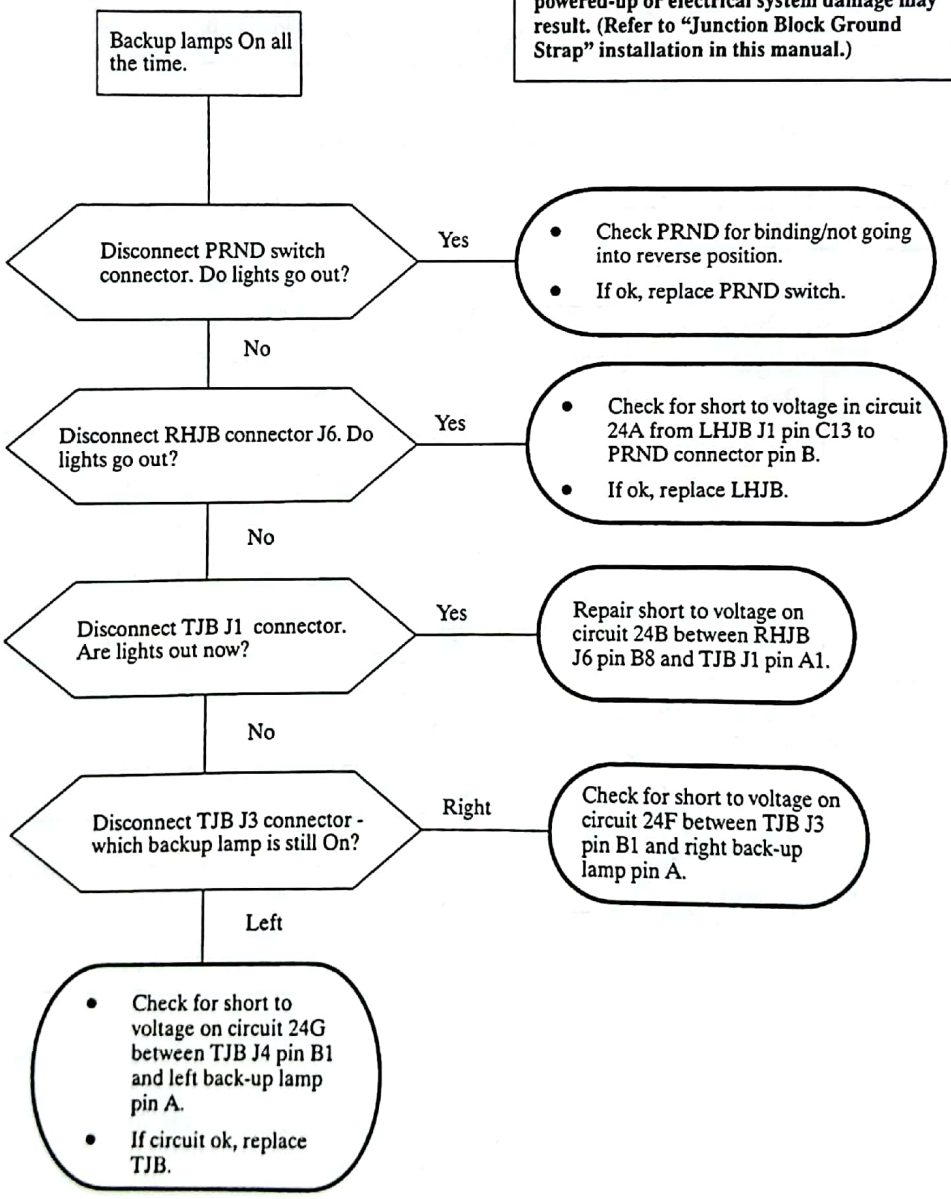
BACKUP LAMPS ON ALL THE TIME

CHART 4

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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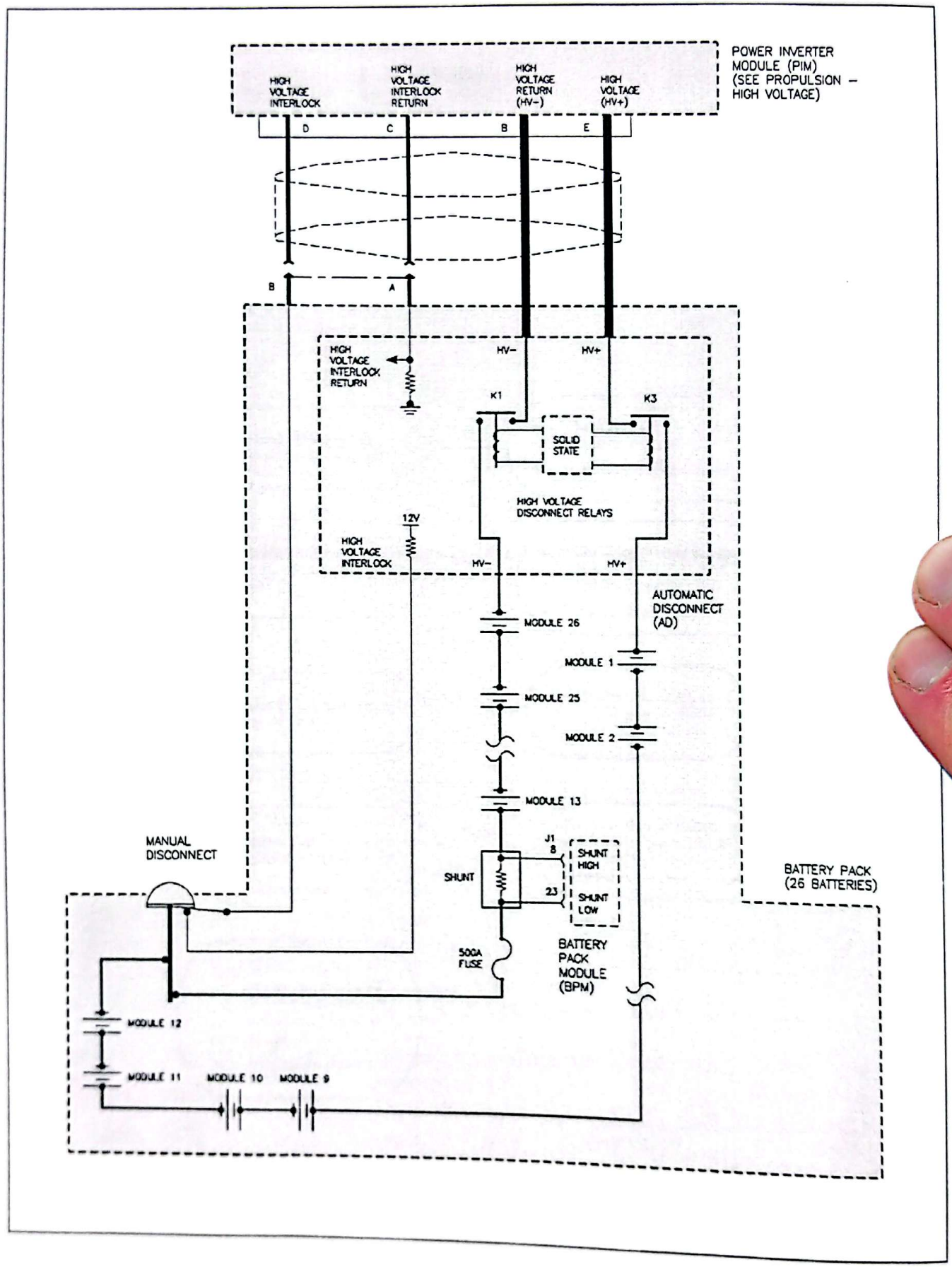
BATTERY PACK (HIGH VOLTAGE)



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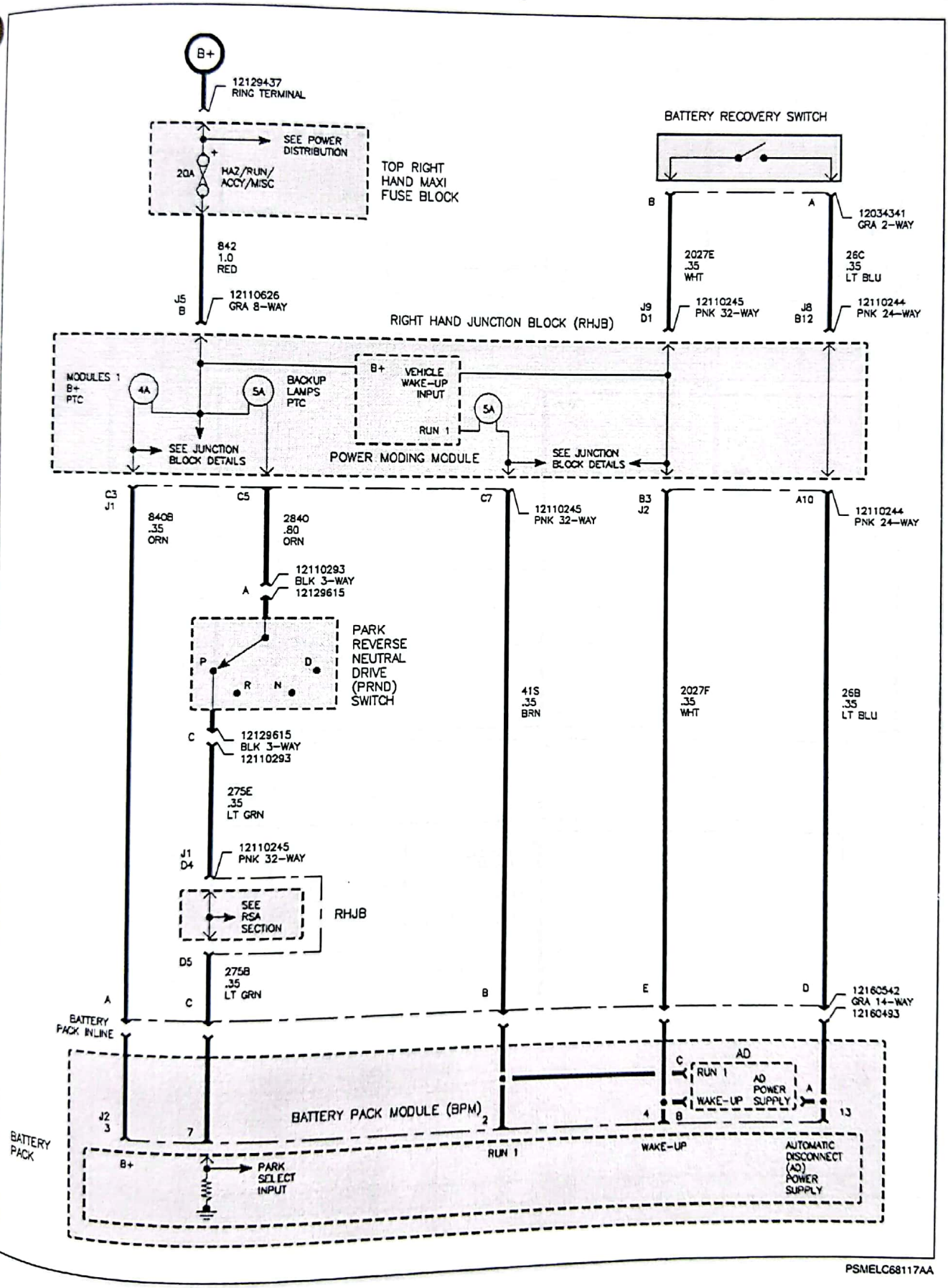

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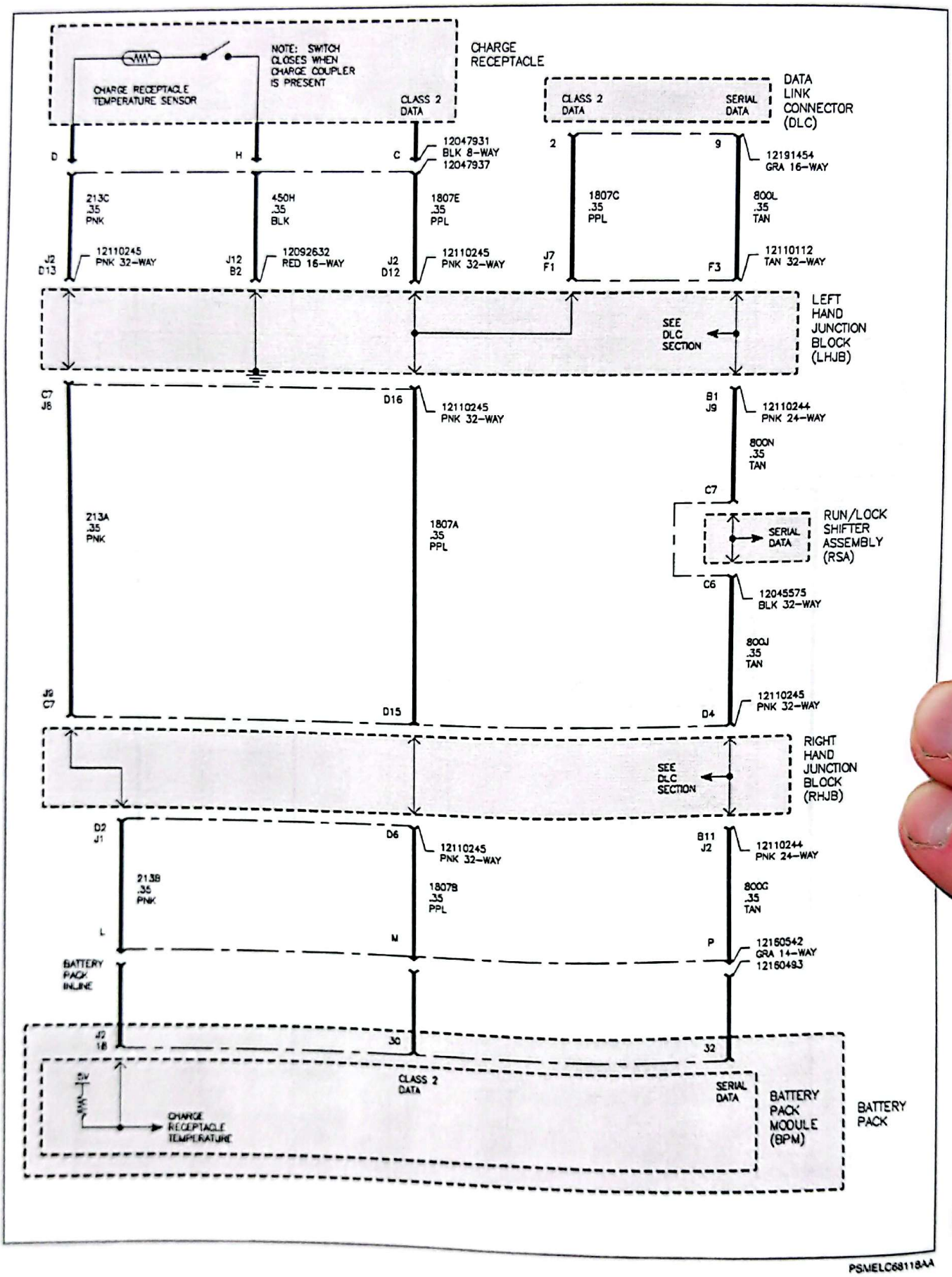

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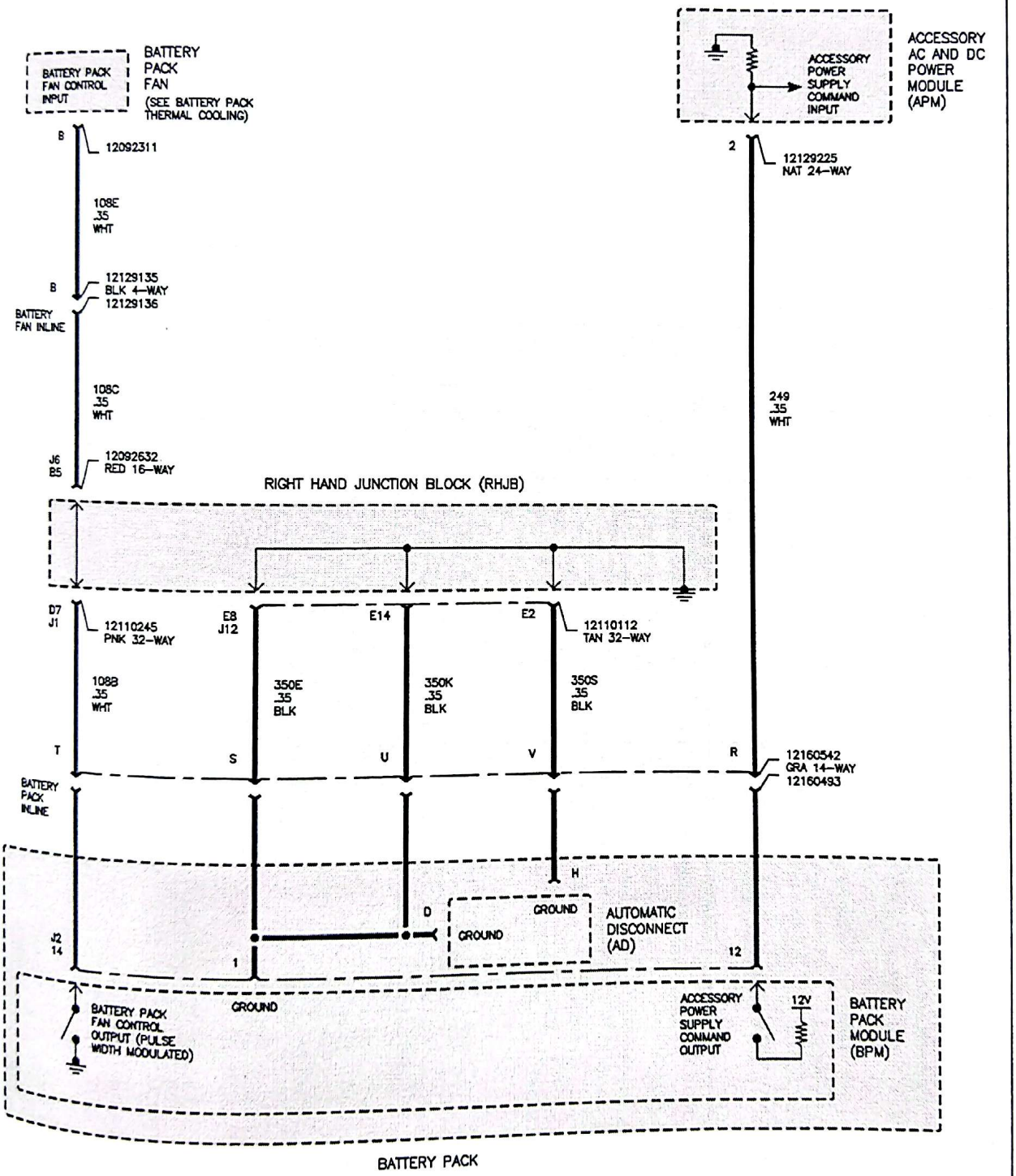

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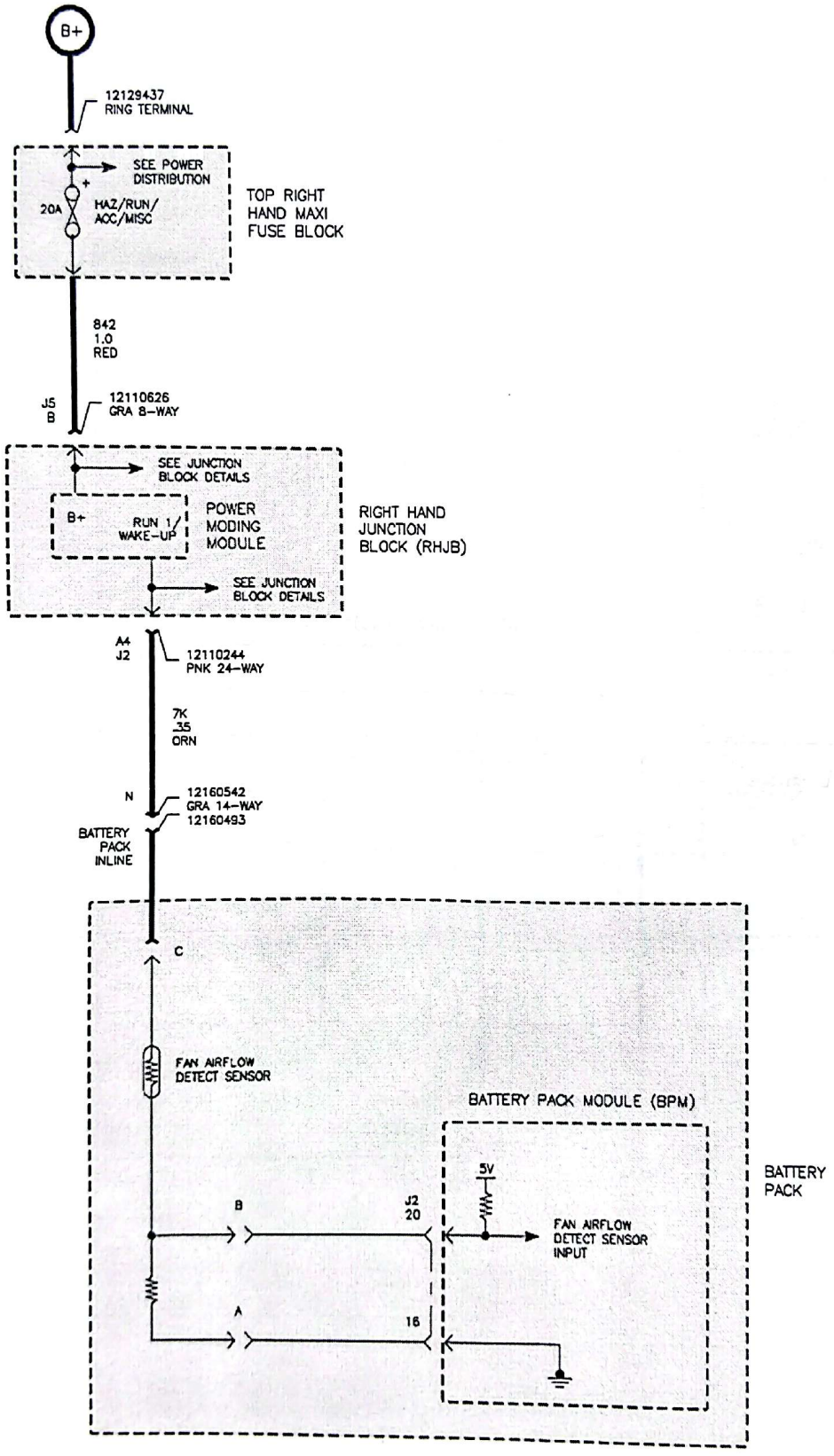

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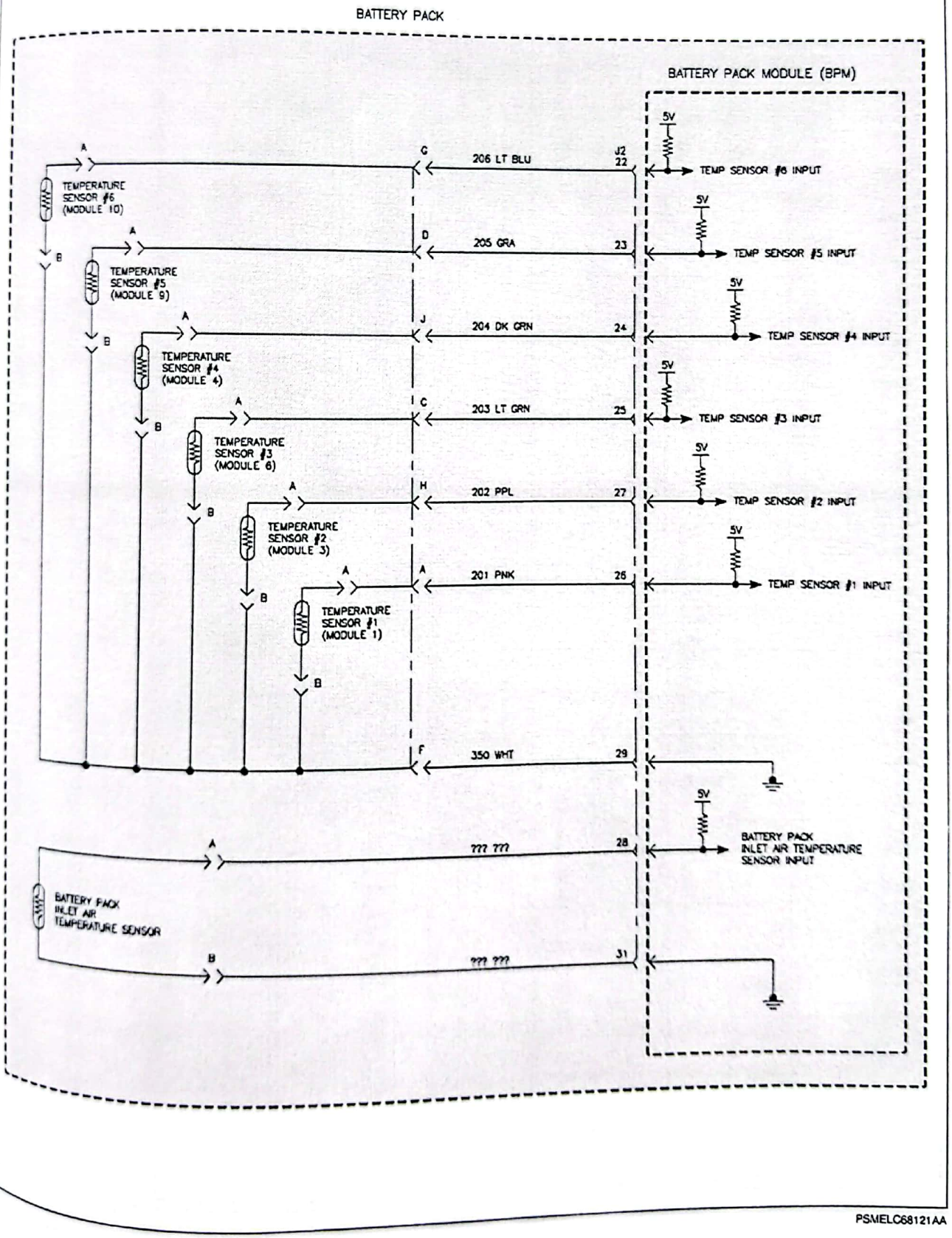

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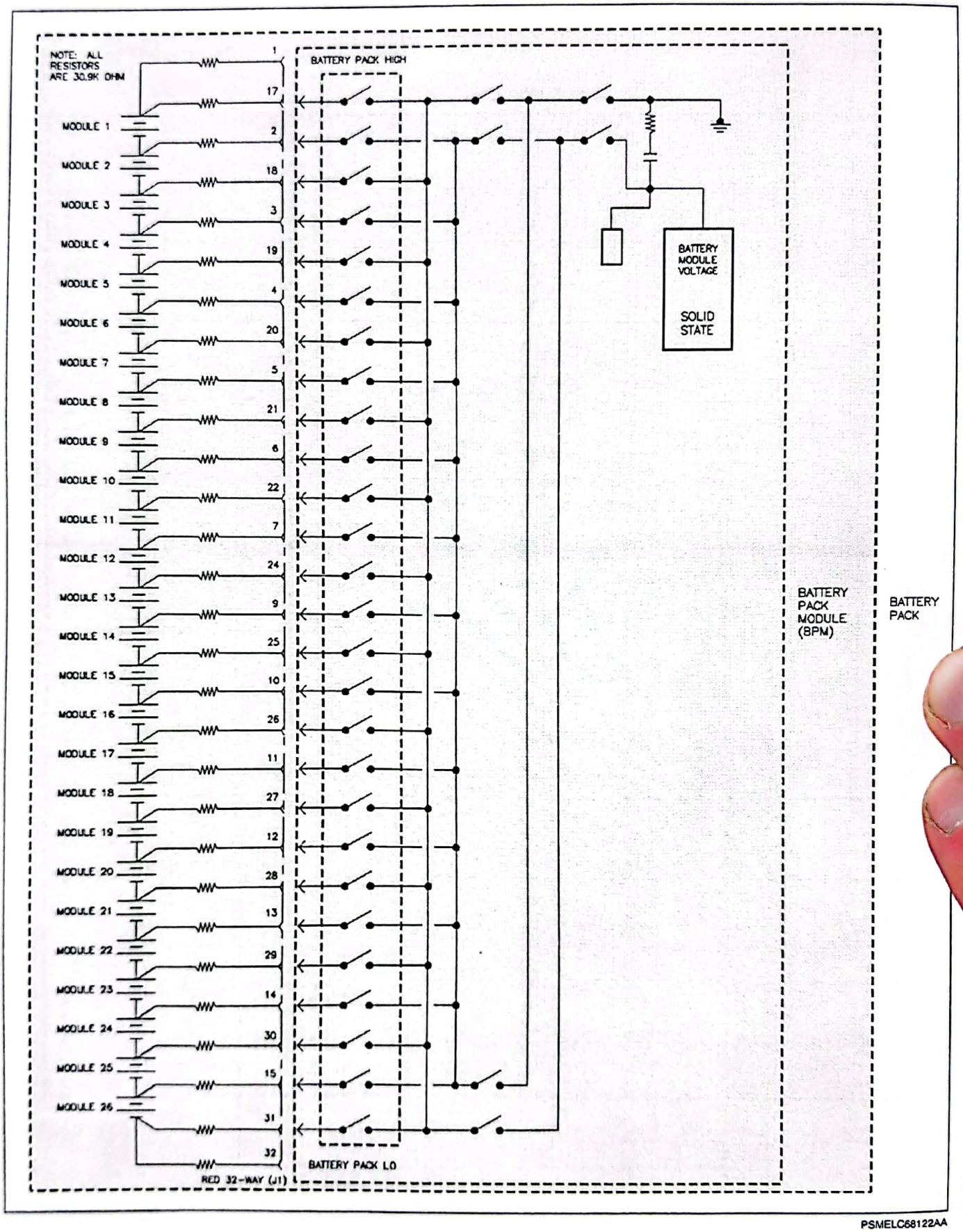

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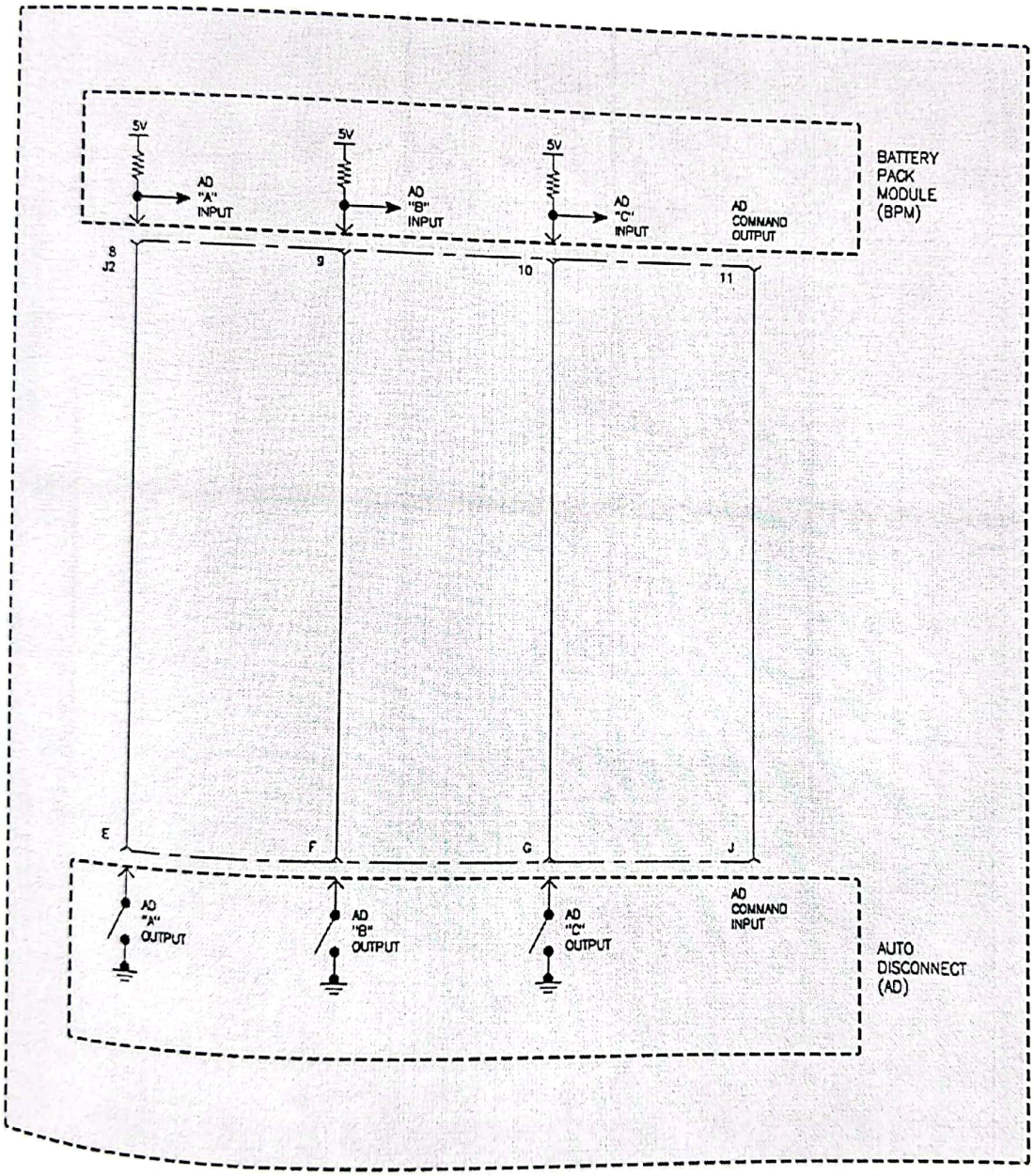
BATTERY PACK (LOW VOLTAGE–CONT.)



BATTERY PACK

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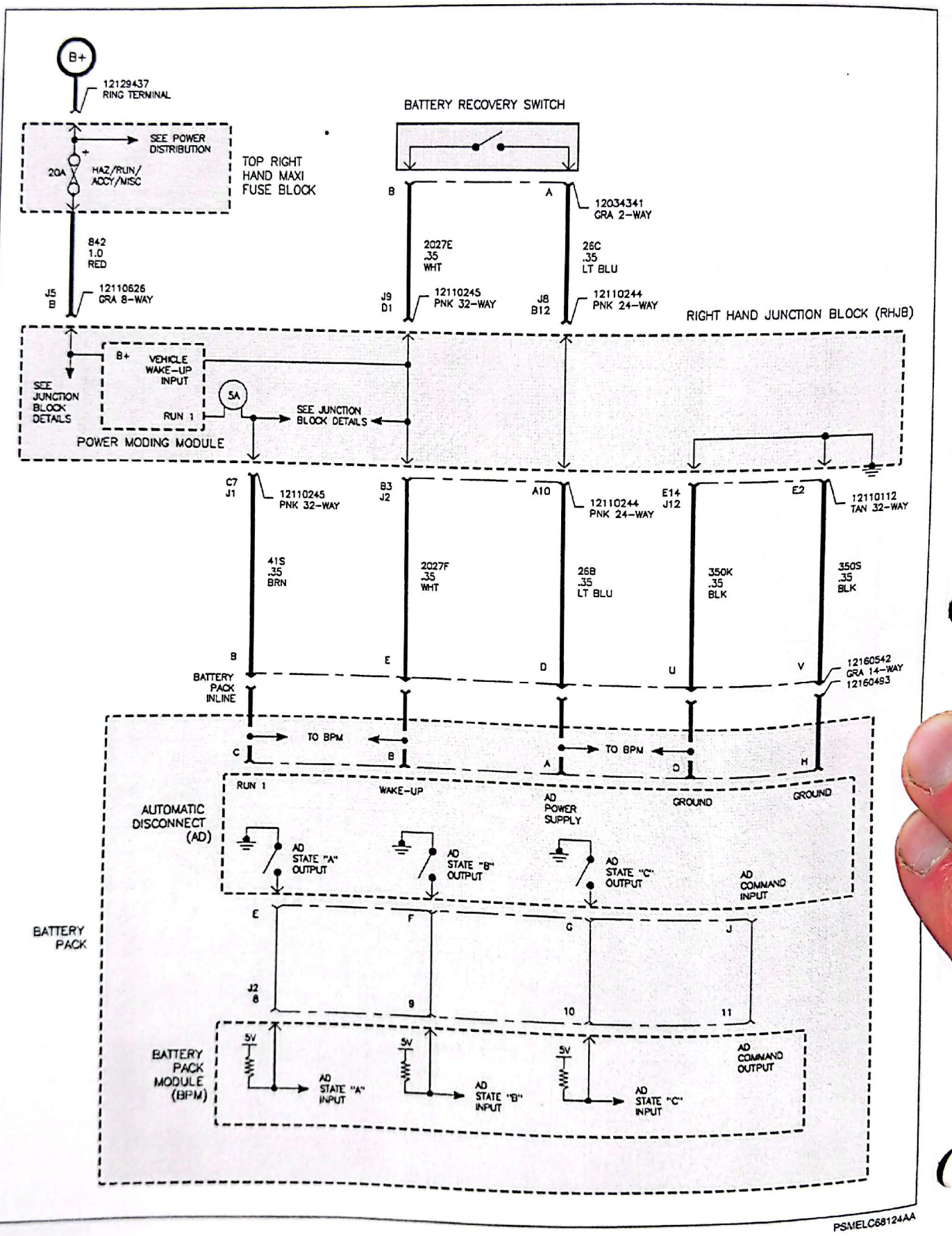
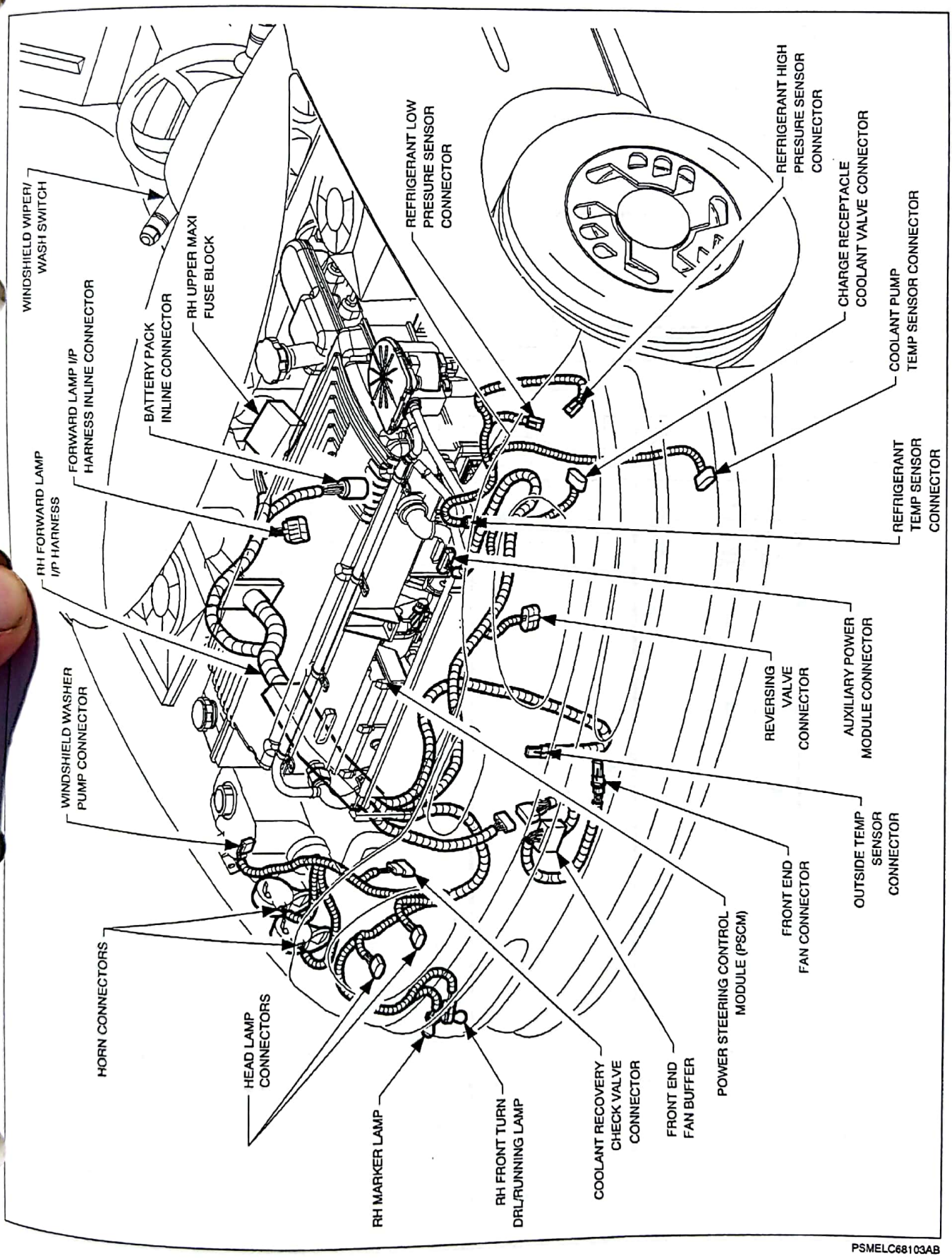
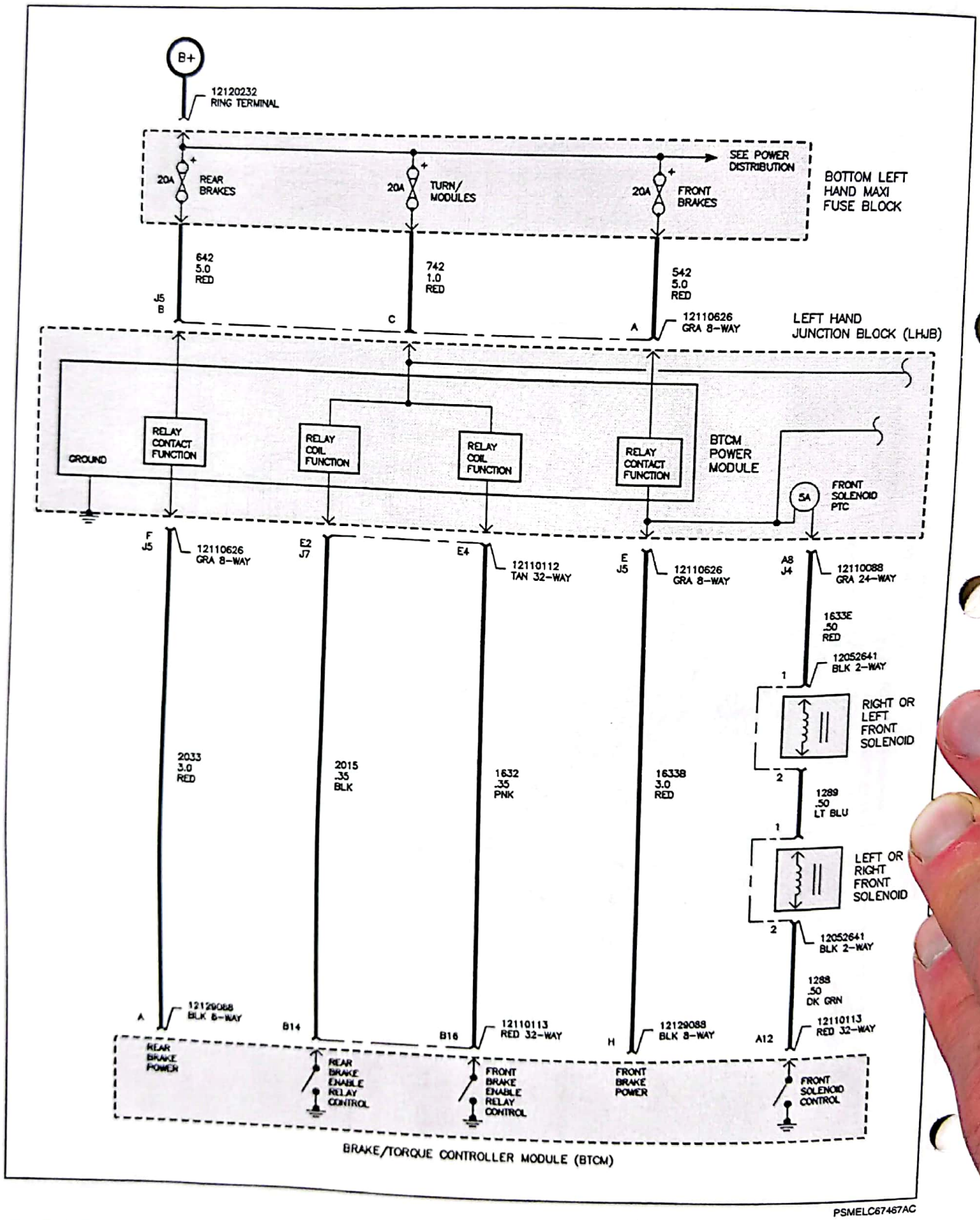
BATTERY PACK (LOW VOLTAGE–CONT.)

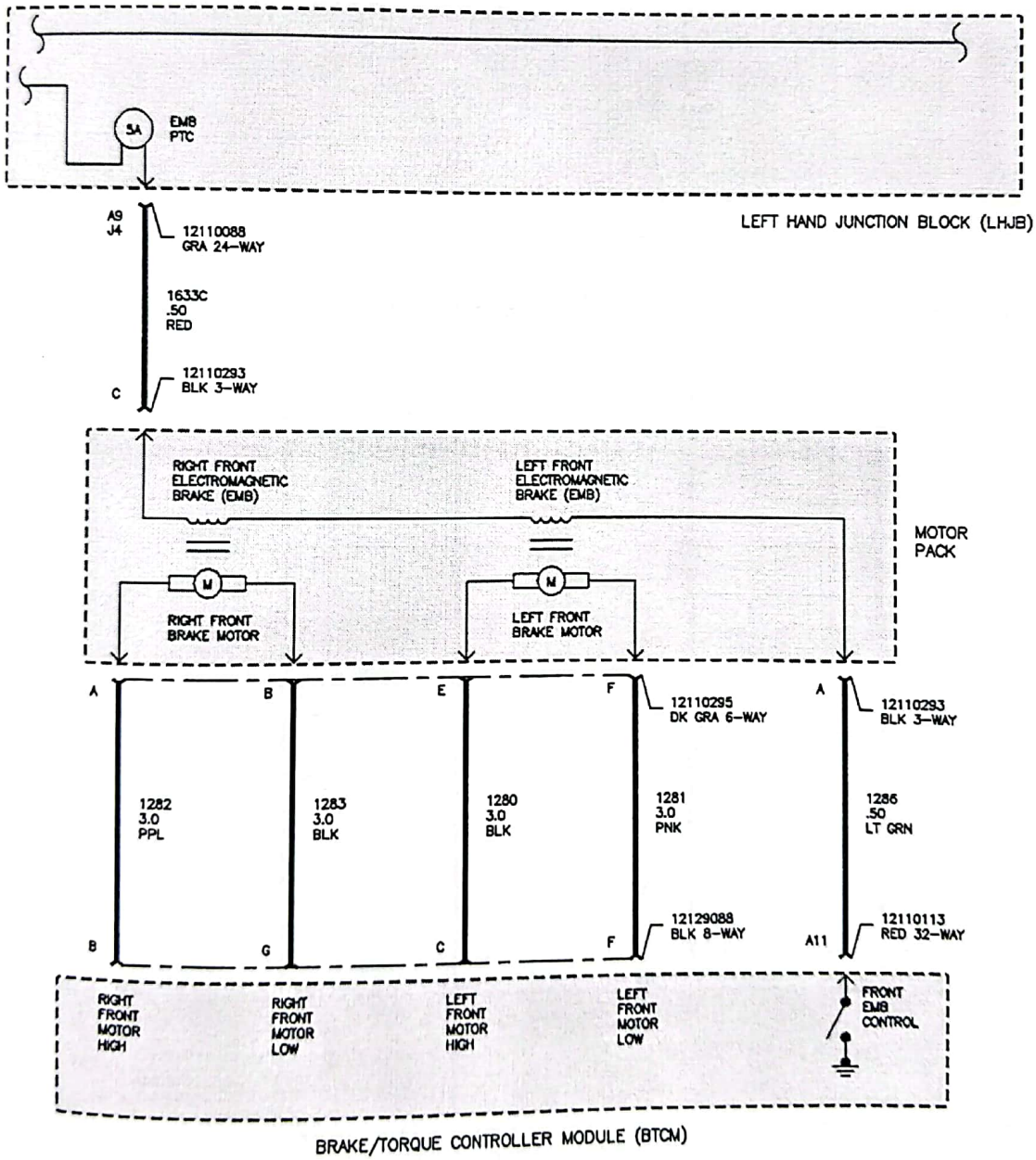


BATTERY PACK (LOW VOLTAGE) COMPONENT LOCATION VIEW



BRAKE SYSTEM





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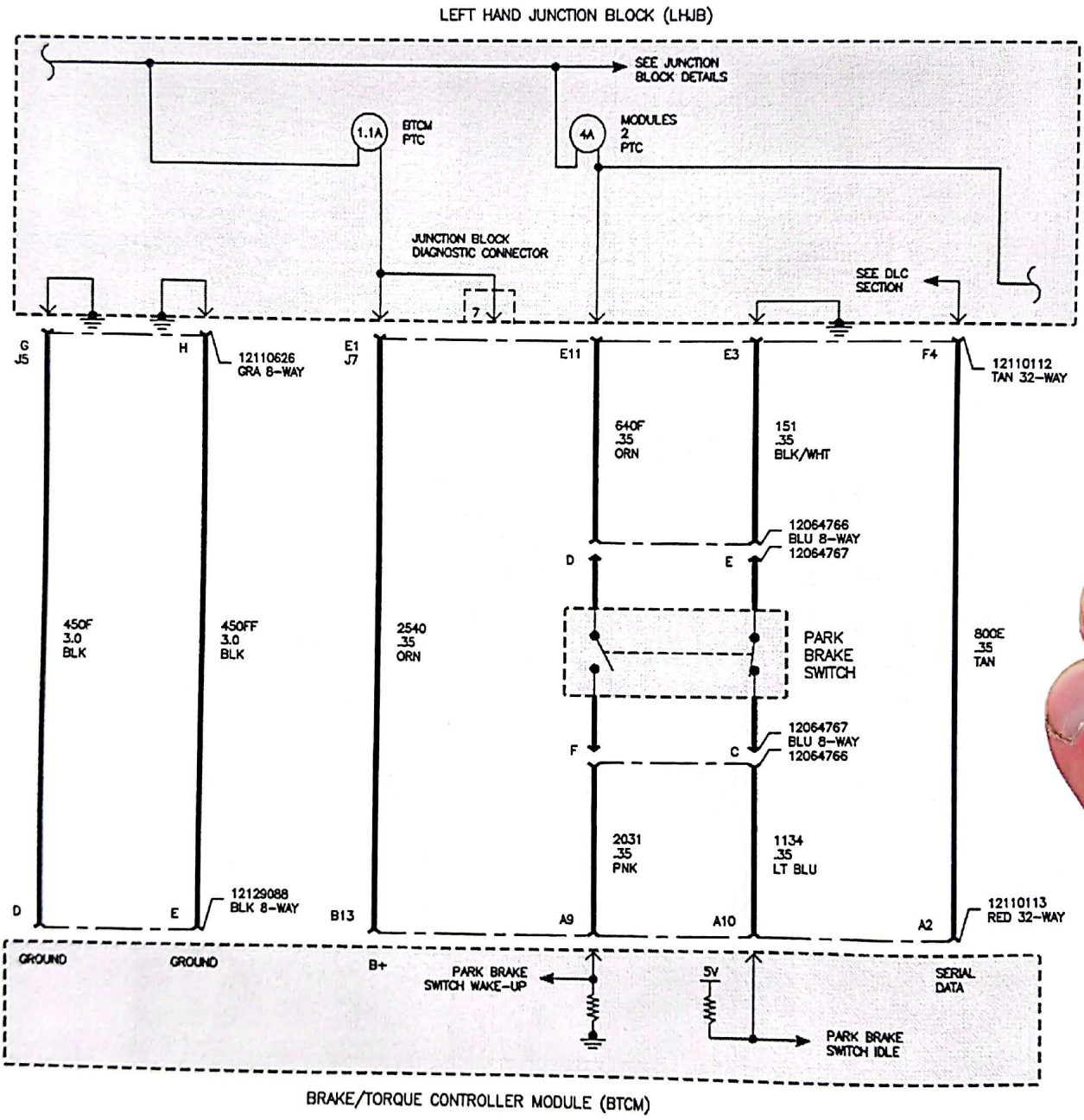

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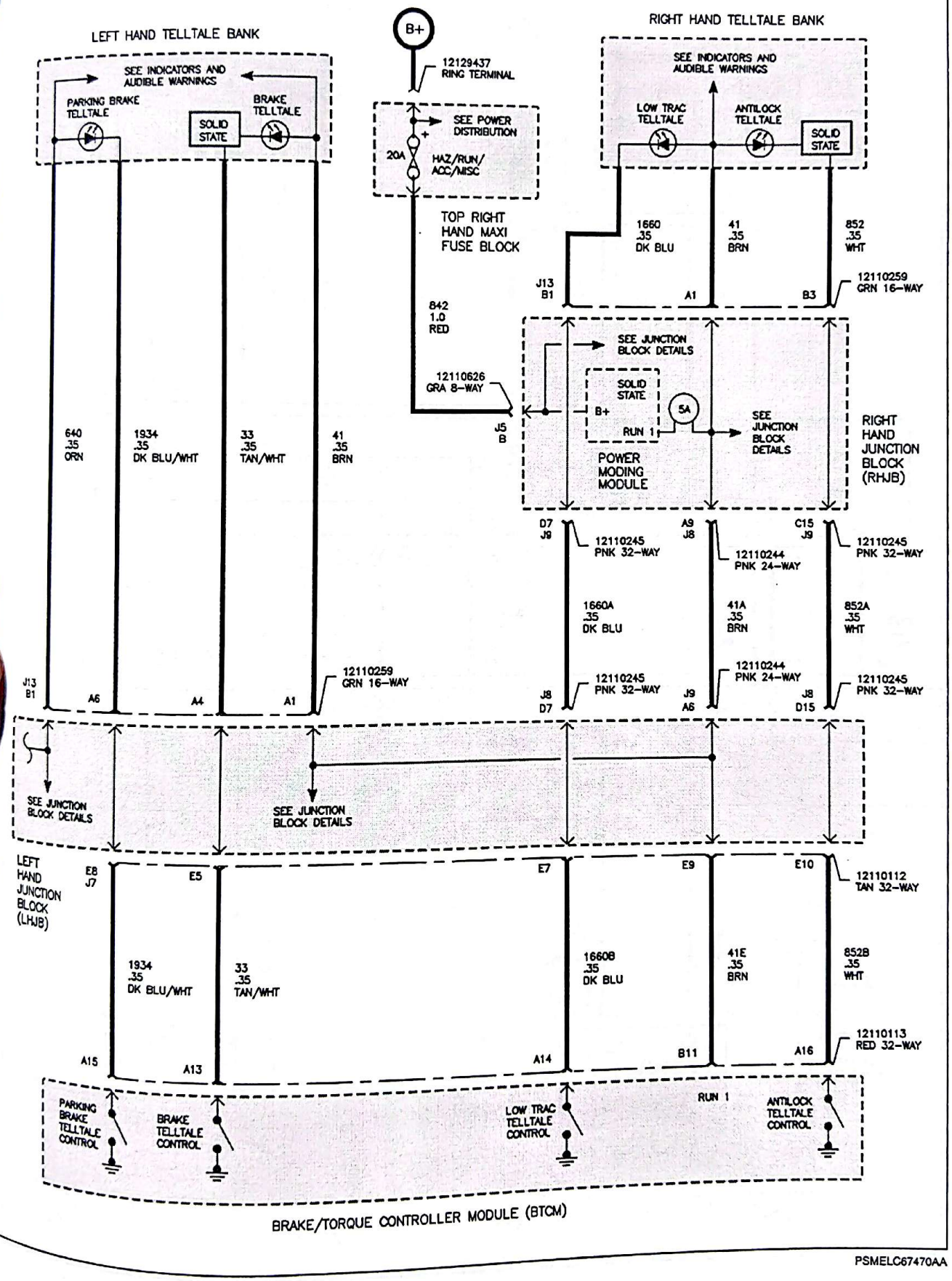

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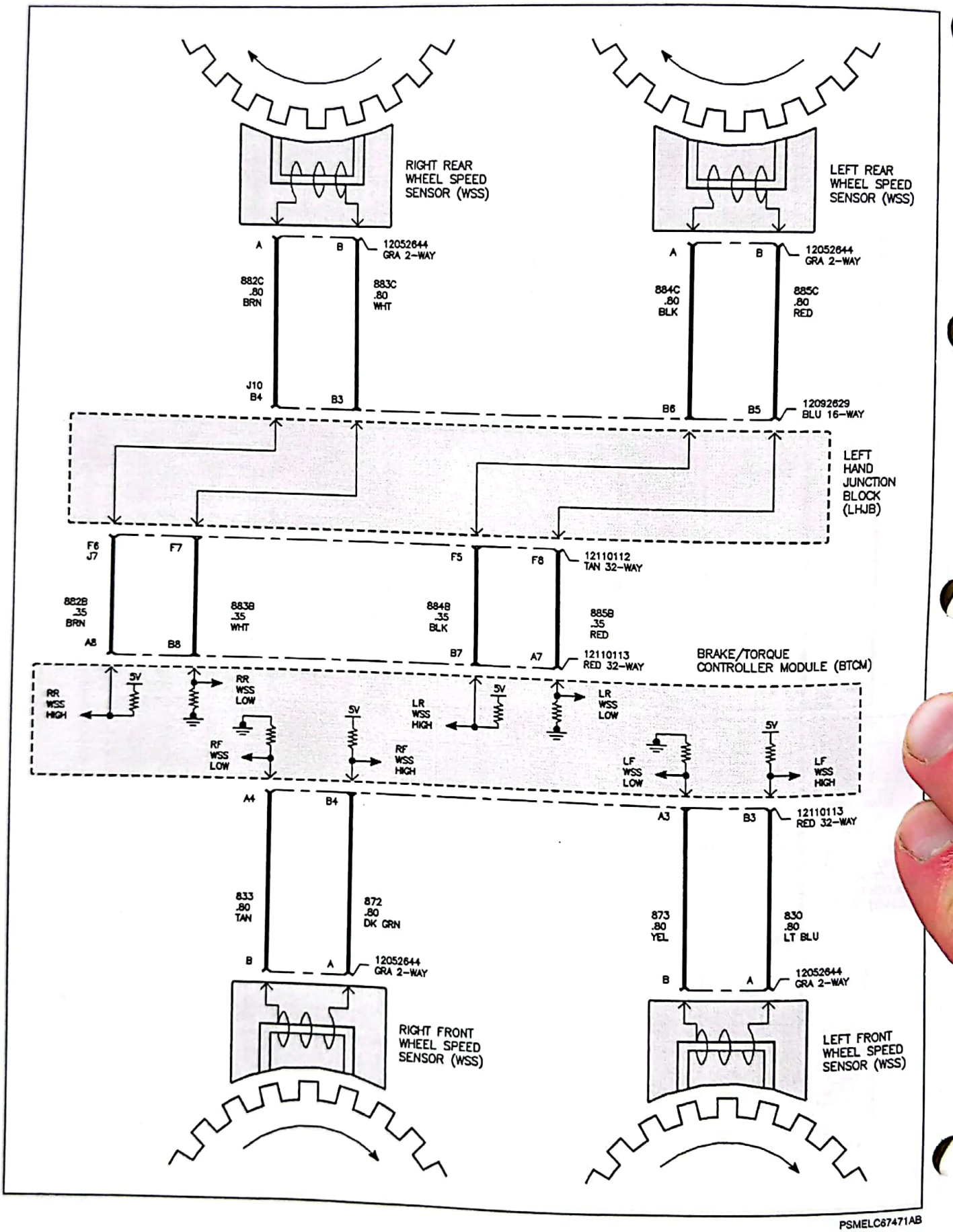

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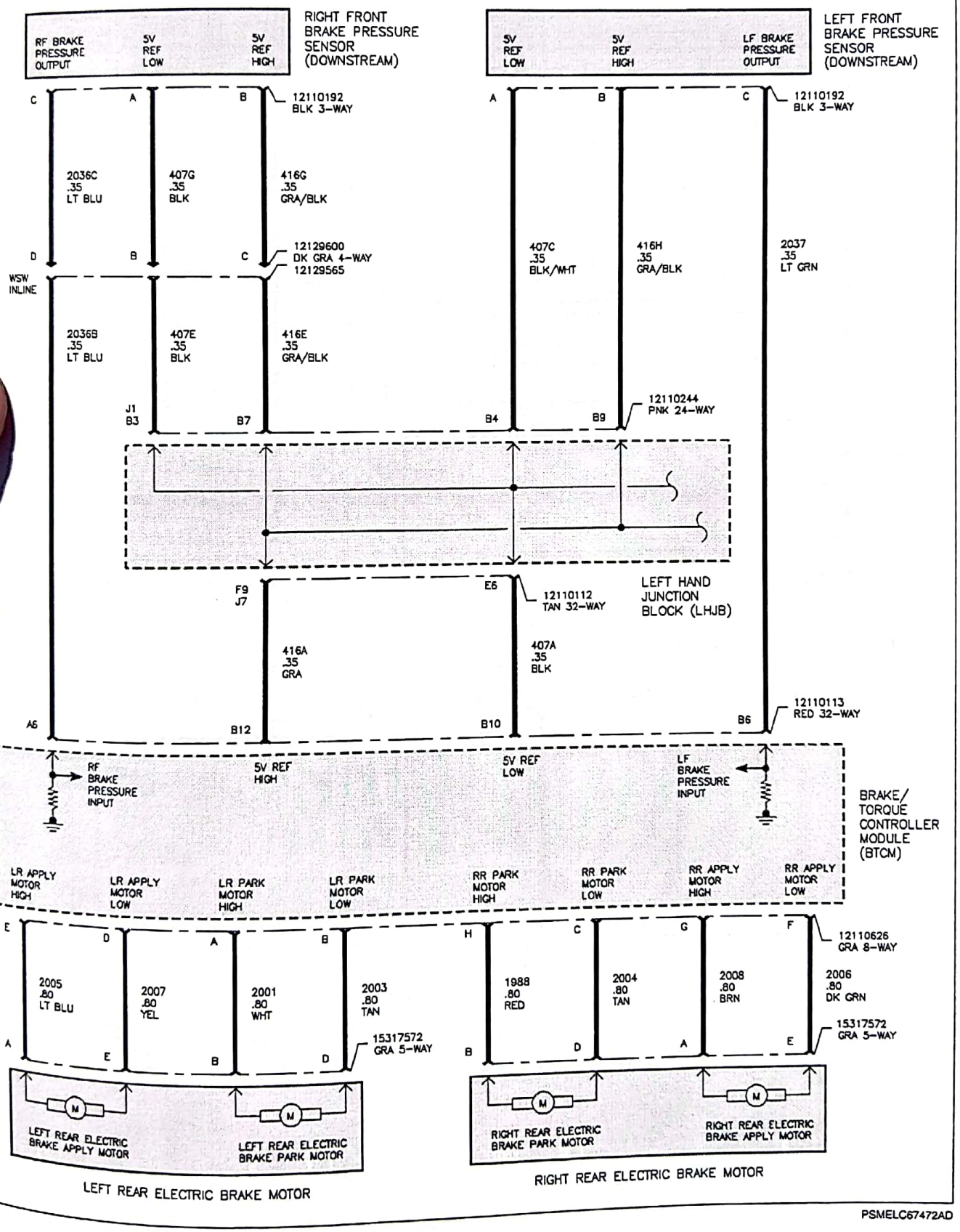
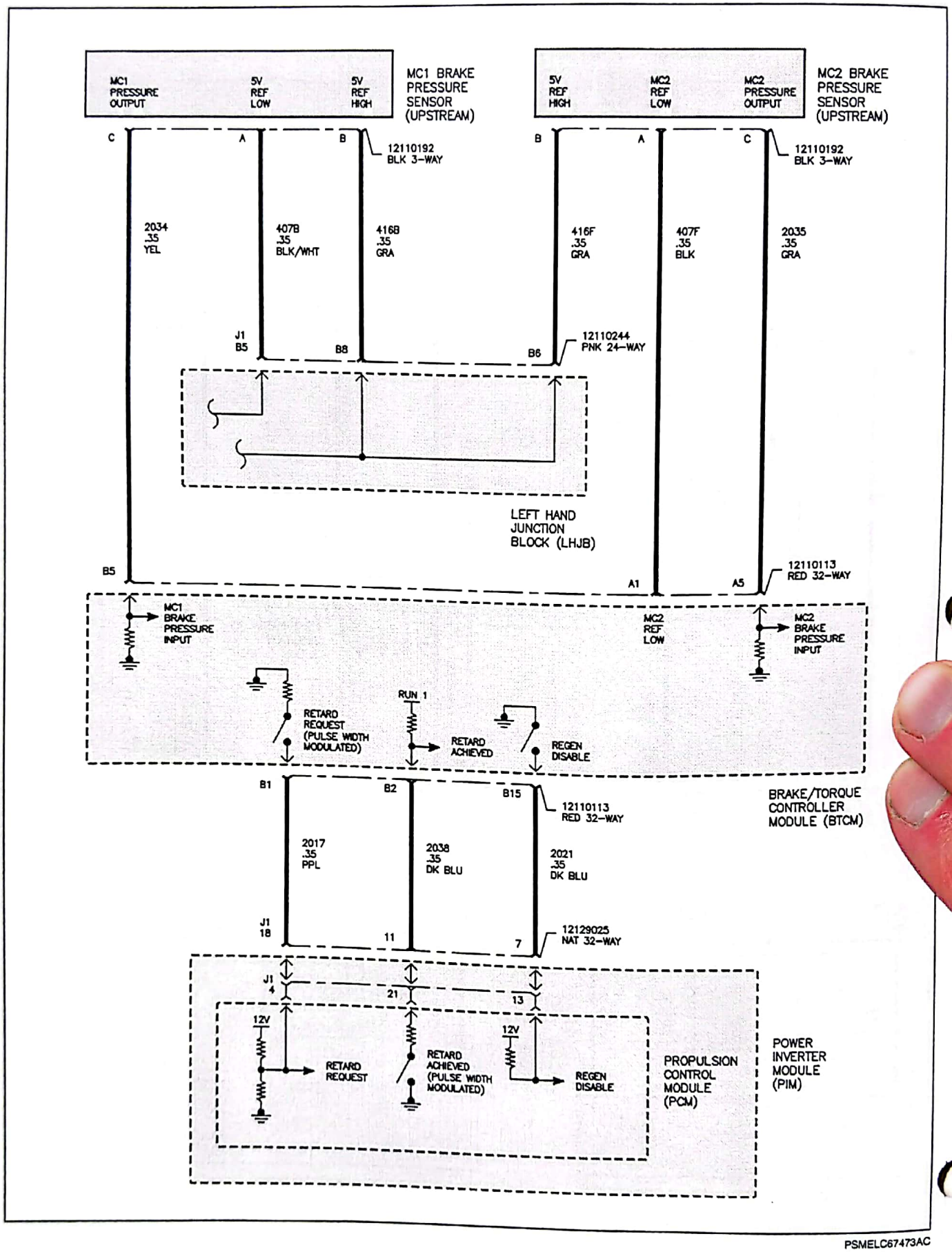

RF BRAKE PRESSURE OUTPUT
5V REF LOW
5V REF HIGH
RIGHT FRONT BRAKE PRESSURE SENSOR (DOWNSTREAM)
5V REF LOW
5V REF HIGH
LF BRAKE PRESSURE OUTPUT
LEFT FRONT BRAKE PRESSURE SENSOR (DOWNSTREAM)
12110192 BLK 3-WAY
2036C .35 LT BLU
407G .35 BLK
416G .35 GRA/BLK
12129600 DK GRA 4-WAY
12129565
WSW INLINE
2036B .35 LT BLU
407E .35 BLK
416E .35 GRA/BLK
407C .35 BLK/WHT
416H .35 GRA/BLK
2037 .35 LT GRN
12110244 PNK 24-WAY
J1 B3
B7
B4
B9
F9 J7
E6
12110112 TAN 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
416A .35 GRA
407A .35 BLK
A6
B12
B10
B6
12110113 RED 32-WAY
RF BRAKE PRESSURE INPUT
5V REF HIGH
5V REF LOW
LF BRAKE PRESSURE INPUT
BRAKE/ TORQUE CONTROLLER MODULE (BTCM)
LR APPLY MOTOR HIGH
LR APPLY MOTOR LOW
LR PARK MOTOR HIGH
LR PARK MOTOR LOW
RR PARK MOTOR HIGH
RR PARK MOTOR LOW
RR APPLY MOTOR HIGH
RR APPLY MOTOR LOW
2005 .80 LT BLU
2007 .80 YEL
2001 .80 WHT
2003 .80 TAN
15317572 GRA 5-WAY
1988 .80 RED
2004 .80 TAN
2008 .80 BRN
2006 .80 DK GRN
12110626 GRA 8-WAY
15317572 GRA 5-WAY
LEFT REAR ELECTRIC BRAKE APPLY MOTOR
LEFT REAR ELECTRIC BRAKE PARK MOTOR
LEFT REAR ELECTRIC BRAKE MOTOR
RIGHT REAR ELECTRIC BRAKE PARK MOTOR
RIGHT REAR ELECTRIC BRAKE APPLY MOTOR
RIGHT REAR ELECTRIC BRAKE MOTOR
PSMELC67472AD



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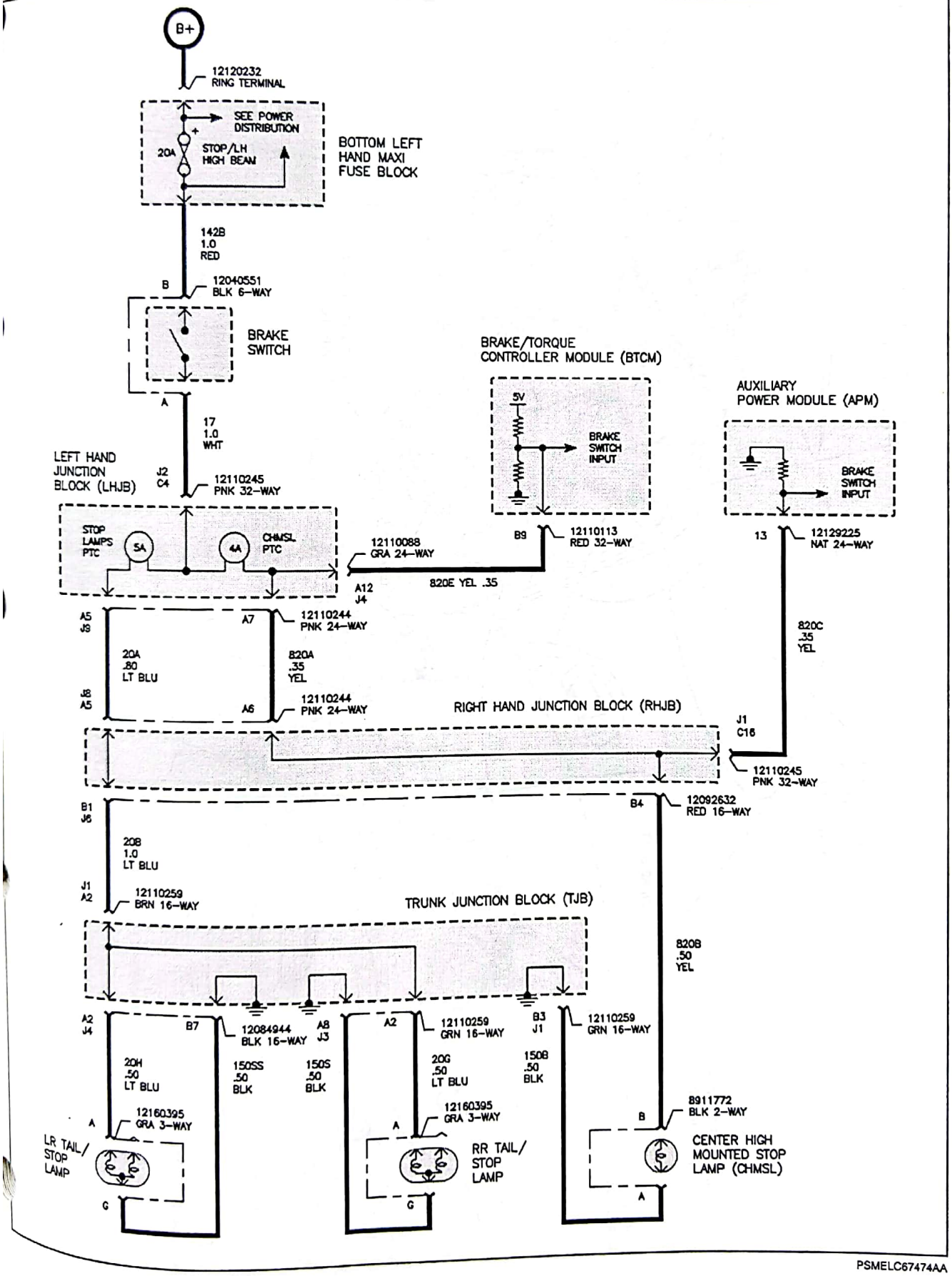

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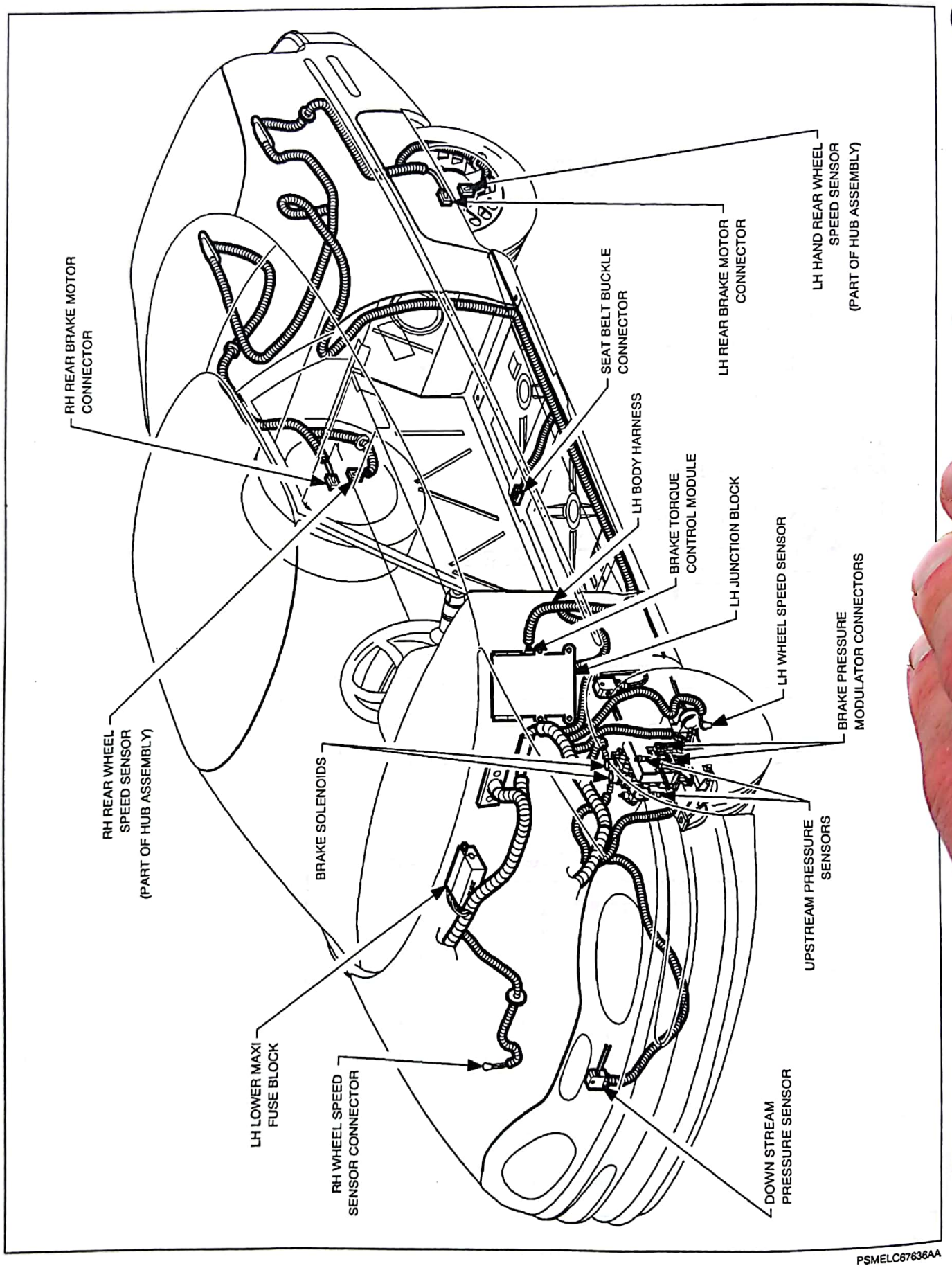
BRAKE SYSTEM COMPONENT LOCATION VIEW



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NOTES

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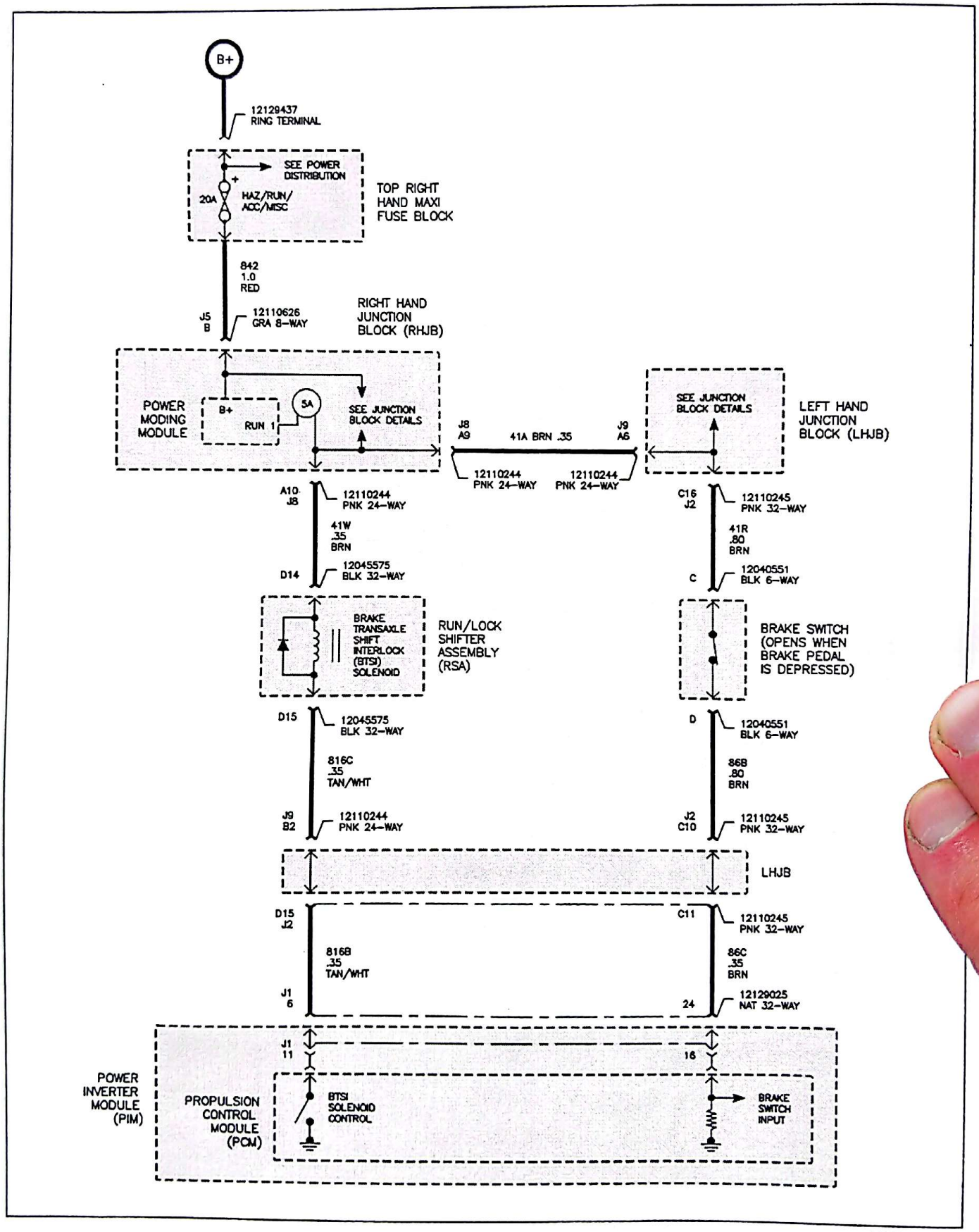
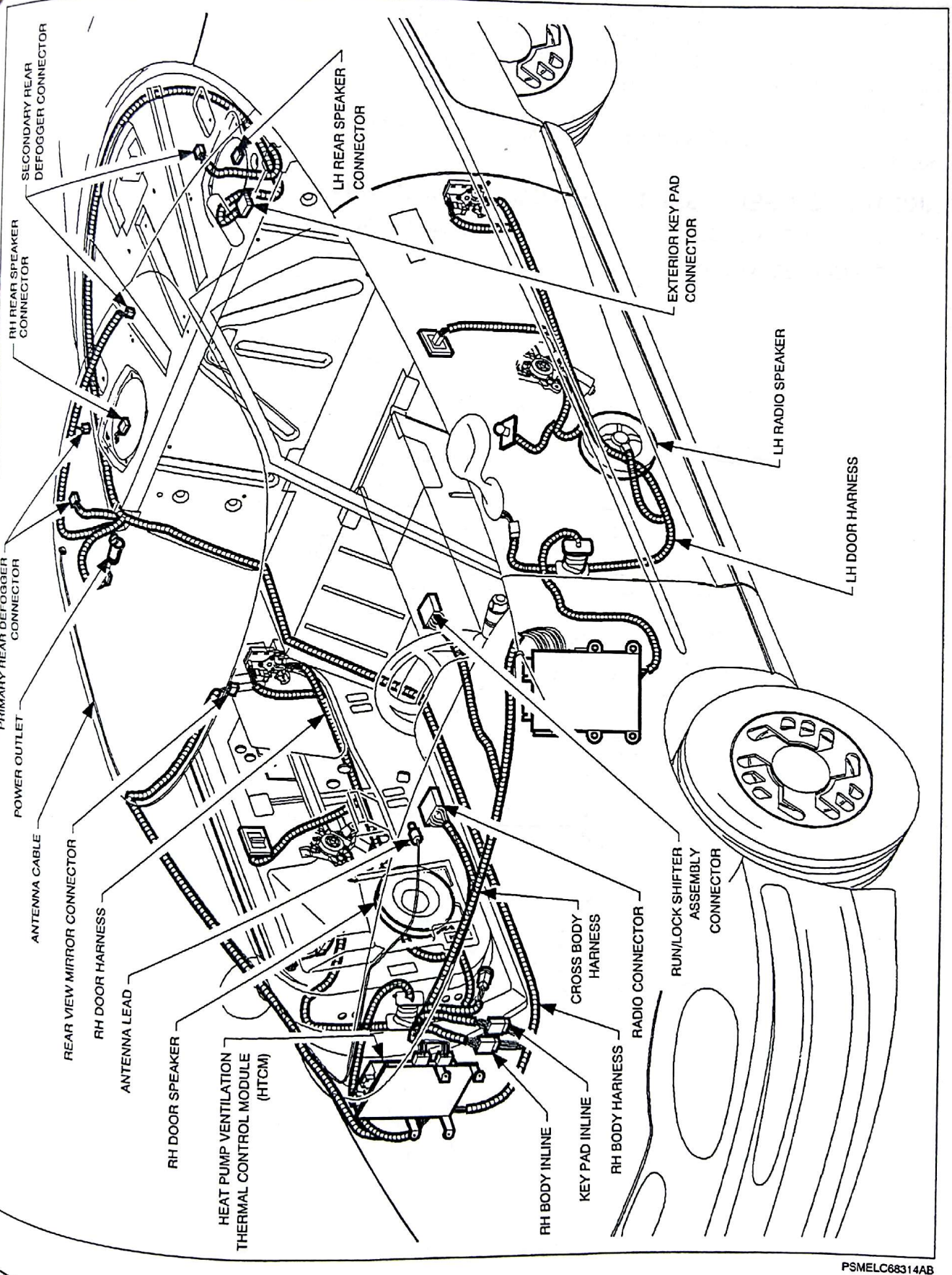
BRAKE TRANSAXLE SHIFT INTERLOCK (BTSI) SYSTEM



PSMELC67859AA

BRAKE TRANSAXLE SHIFT INTERLOCK (BTSI) SYSTEM COMPONENT LOCATION VIEW



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BRAKE TRANSMISSION SHIFT INTERLOCK (BTSI)

The Brake Transmission Shift Interlock (BTSI) solenoid receives power from the Run 1 power circuit 41 from the RHJB. The ground for the BTSI is controlled by the PCM based on several inputs. One input is a battery voltage from the brake switch. Whenever the brake pedal is depressed the PCM sees the 12 volt signal through the brake switch drop to zero volts. Another input to the PCM is the charge receptacle. If the charge receptacle indicates the charge paddle is inserted, the PCM will not allow the BTSI to be enabled. If the charge receptacle is not showing that a charge paddle is inserted, and the PCM sees a loss of battery voltage from the brake switch, the PCM grounds circuit 816 to turn on the BTSI solenoid.

There are additionally, certain DTCs that may cause the PCM not to enable the BTSI solenoid. DTCs should always be diagnosed first.

BRAKE TRANSMISSION SHIFT INTERLOCK (BTSI) TROUBLE TREE INDEX

- Chart 1 – Brake Transmission Shift Interlock (BTSI) Solenoid Not Allowing Shift Out of Park
- Chart 2 – Can Shift Out of Park Without Brake Applied

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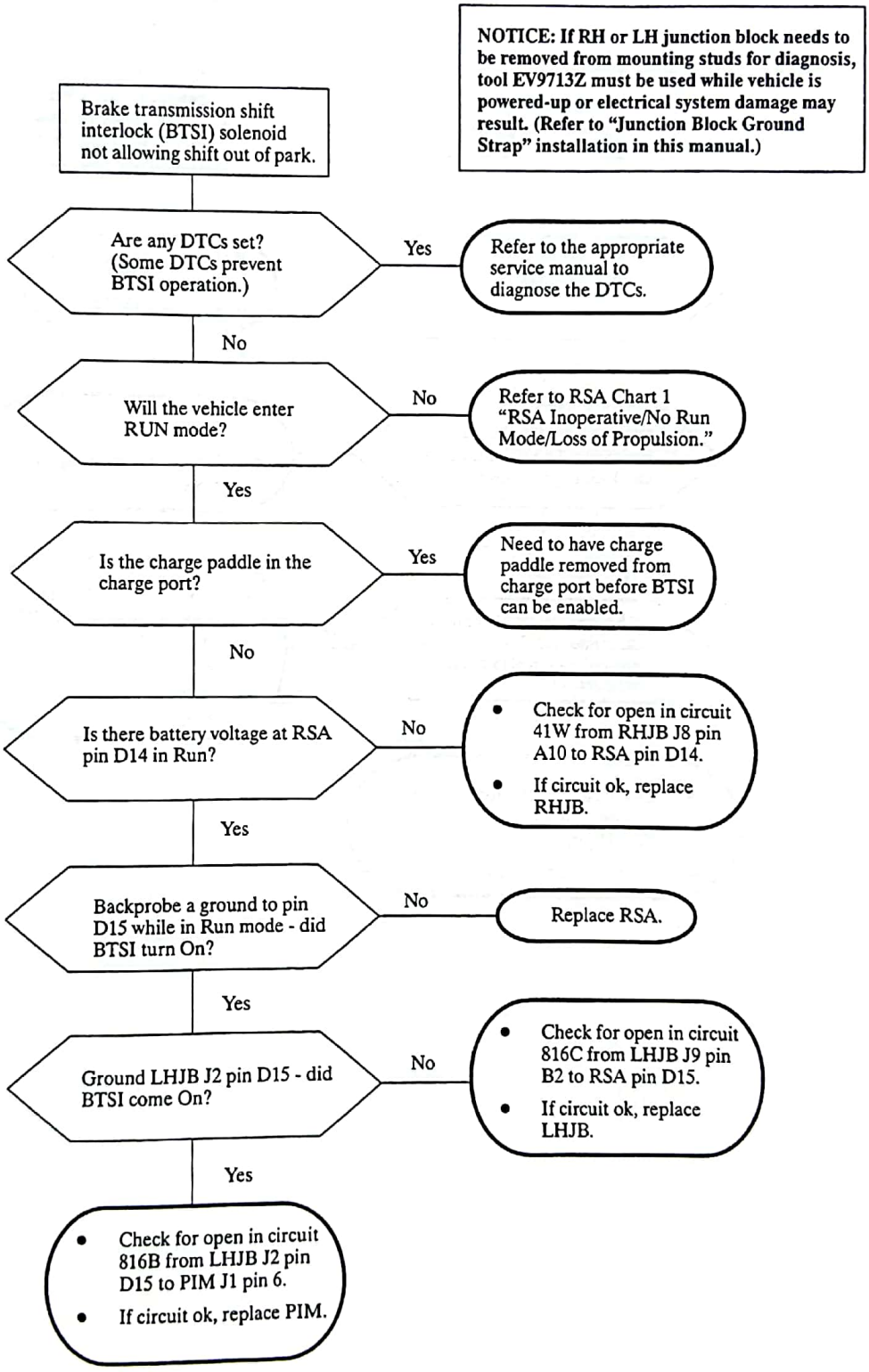
BRAKE TRANSMISSION SHIFT INTERLOCK (BTSI) SOLENOID NOT ALLOWING SHIFT OUT OF PARK

CHART 1



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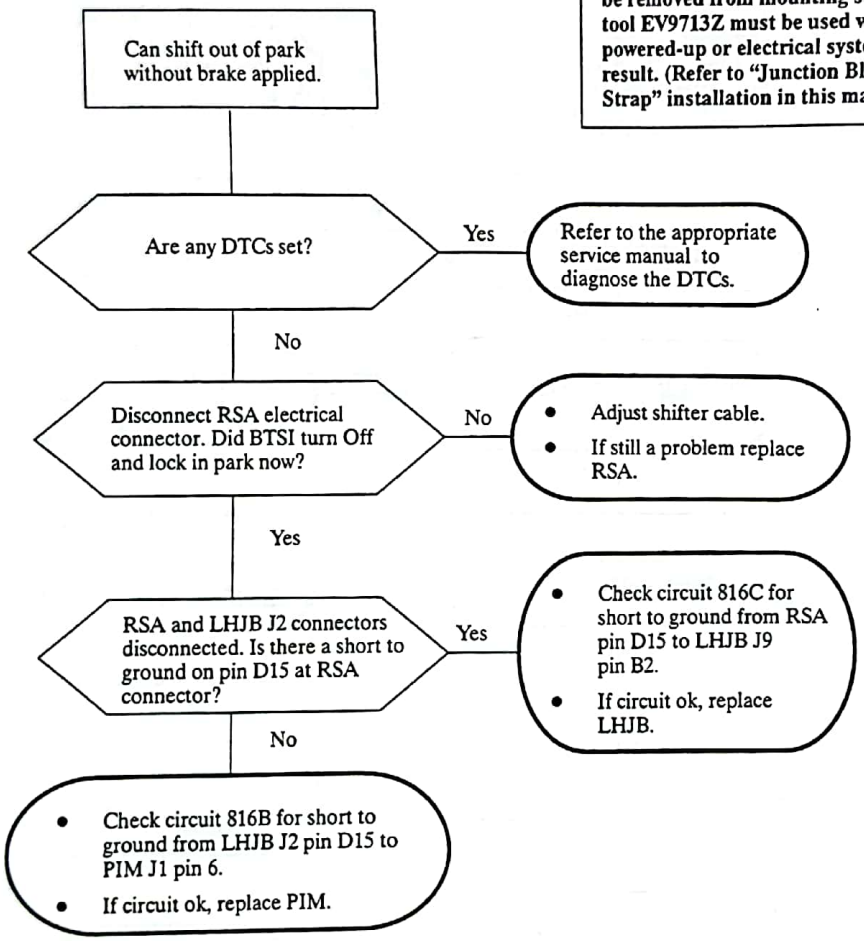
CAN SHIFT OUT OF PARK WITHOUT BRAKE APPLIED

CHART 2

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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NOTES

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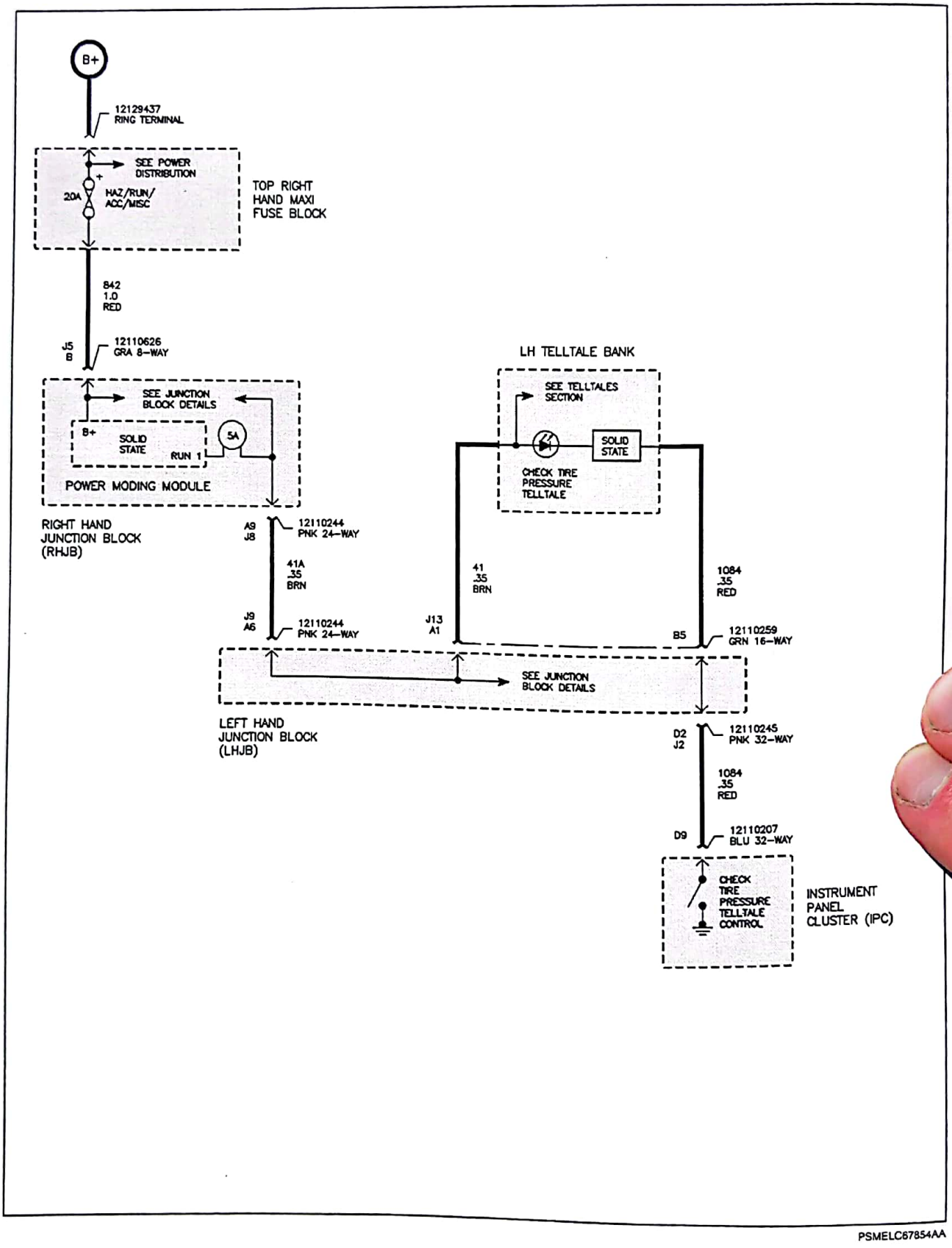
CHECK TIRE PRESSURE SYSTEM SCHEMATICS



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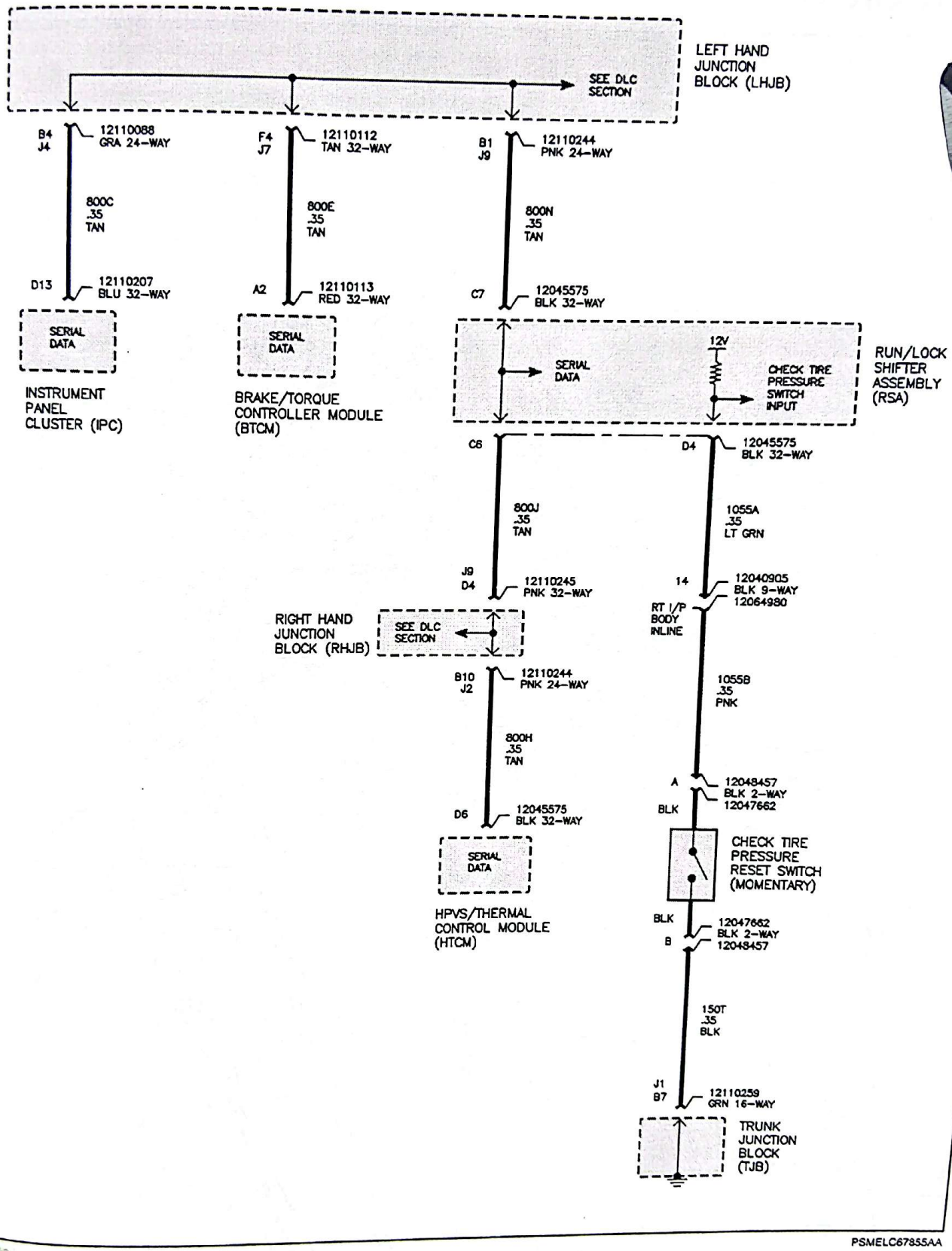

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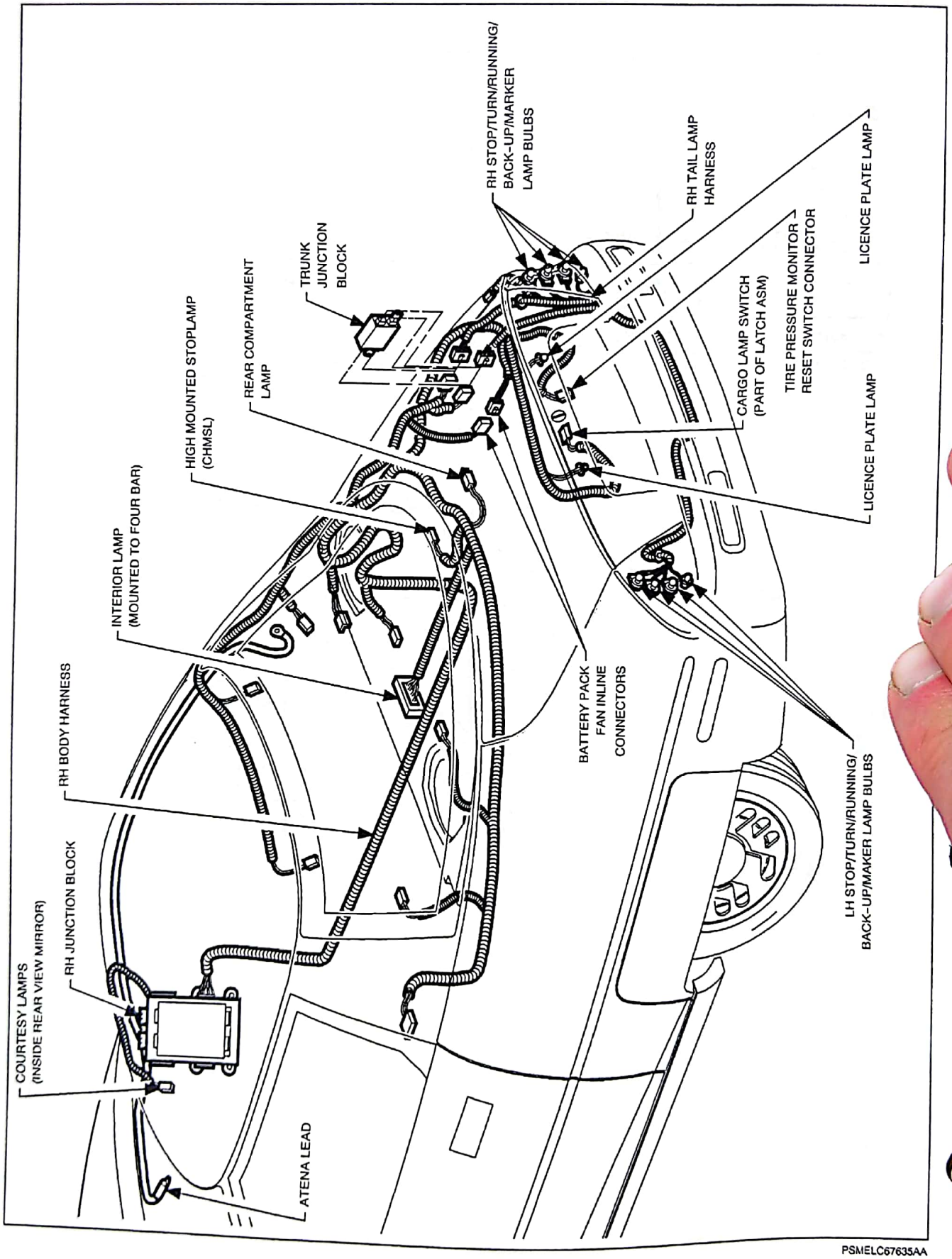
CHECK TIRE PRESSURE SYSTEM COMPONENT LOCATION VIEW



CHECK TIRE PRESSURE SYSTEM (CTPS)

GENERAL DESCRIPTION

The check tire pressure system (CTPS) can alert the driver to a large change in the pressure in one tire. The CTPS is operated by the run/lock shifter assembly (RSA). The RSA monitors wheel speed information it receives over serial data from the brake torque control module (BTCM) to determine if there is a consistent difference in tire rotation speeds. It will not alert you if the pressure in more than one tire is low or high or the system is not calibrated properly.

If the RSA determines there is a low tire pressure condition, it will send a message via serial data to turn on the check tire pressure telltale. The instrument panel cluster (IPC) will then turn on the telltale. Once a low tire pressure condition is detected, the telltale will be kept on whenever in RUN mode until the RSA loses power or the check tire pressure reset switch is pressed. The low tire pressure warning switch is a momentary switch located on the bottom side of the deck lid. It will reset the CTPS in any mode.

Don't press the tire monitor reset switch without first checking and adjusting the pressure in all four tires. When a reset occurs, the RSA begins its calibration all over and will assume tires are at a normal inflation level. Therefore, if a tire has lost pressure and the RSA is reset, the tire will have to lose significantly more air before the check tire pressure warning will trigger again. For this reason, it is important that any leaks are repaired and tires are at normal inflation level before the reset is activated.

If the system has been calibrated and the pressure in one tire becomes at least 69 kPa (10 psi) lower than the other three tires the check tire pressure telltale will come On within about five to ten minutes of driving (within about four to seven minutes if 83 kPa (12 psi) low, within about two to six minutes if 62 kPa (16 psi) low, and less than two minutes if flat). The system won't alert you before you drive that a tire is low or flat.

If the vehicle is driven over bumpy roads, at very low speeds, in turns, in ABS or traction control modes, or with repeated stopping and starting, detection will take longer.

Anytime the anti-lock telltale is On the check tire pressure system is disabled.

Any time the tires are repaired, replaced, or rotated, or tire pressure is adjusted, the CTPS system needs to be recalibrated.

SYSTEM RESET AND CALIBRATION

1. Switch the vehicle to the Run mode. (The CTPS may be reset with the vehicle in OFF/ACCY or LOCK mode also. It is preferred to perform reset in the Run mode so the telltale can be watched and is verified to go out.)
2. Press the CTPS reset switch, located on the underside of the decklid. The check tire pressure telltale should go out. If the telltale doesn't go out within a few seconds after you press the CTPS reset switch, refer to Telltales - Chart 7- "Check Tire Pressure Telltale Inoperative/On All the Time."
3. System calibration will begin when the vehicle is driven.

NOTICE: **Since the check tire pressure system works off of wheel speed comparisons, it will not operate if the vehicle is not calibrated prior to the tire pressure loss. If the tires are replaced and the system is not calibrated, a tire may go flat without triggering a fault. THIS IS NORMAL OPERATION. If that has happened, the tire should be repaired as normal. After the tire is repaired and installed back on the vehicle, reset the CTPS switch located in the trunk. (Refer to steps listed above.)**

Calibrations are performed in three different speed ranges: 24–64 km/h (15-40 mph), 64–105 km/h (40-65 mph), and 105–129 km/h (65-80 mph). The calibrations for each speed range are performed while the vehicle is in that speed range. An initial rough calibration is performed for each speed range during the first 10 minutes of driving in that speed range. The calibration is cumulative and may be performed over several keypad cycles. Once the initial calibration is complete the vehicle will begin monitoring tires for a change in pressure. There is a fine tuning calibration (CAL–MON on scan tool) that takes place after the rough calibration is complete. If the vehicle is driven over bumpy roads, at very low speeds, in turns, in ABS or traction control modes, or with repeated stopping and starting, detection will take longer. During these kinds of driving, fine tuning calibration is suspended. The fine tuning may take as little as three minutes of driving under ideal conditions to much longer if the driving conditions are mostly not calibratable. Once the fine tune calibration is complete, low tire pressure detection occurs more quickly.

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DETECTION

Detection checking only begins after calibration has occurred. Because of the way the detection works, more than one speed range usually needs to be at least rough calibrated before detection checking will operate. Detection speeds versus calibration speeds are shown in the table below. Note that the detection speed ranges are different from the calibration speed ranges.

For example, detection will occur between 24–45 kPa (15–28 mph) if the speed range 24–64 km/h (15–40 mph) is calibrated. For detection in the speed range 45–85 km/h (28–53 mph), however, both the 24–64 (15–40 mph) and the 64–105 km/h (40–65 mph) speed ranges must be calibrated. A special flat tire detection occurs during the first 30 seconds of driving over 8 km/h (5 mph). Flat tire detection takes place in any detection speed range that is calibrated.

WHEN AT LEAST ROUGH CALIBRATION IS COMPLETE IN THE INDICATED SPEED RANGES			
DETECTION OCCURS IN THE RANGE OF	**24–64 km/h (15–40 MPH)**	**64–105 km/h (40–65 MPH)**	**105–129 km/h (65–80 MPH)**
24–45 km/h (15–28 mph)	x		
45–85 km/h (28–53 mph)	x	x	
85–129 km/h (53–80 mph)		x	x

CHECK TIRE PRESSURE SYSTEM (CTPS) TROUBLE TREE INDEX

Chart 1 – Check tire pressure telltale on

Chart 2 – Tire low or flat with no "Check Tire Pressure" telltale

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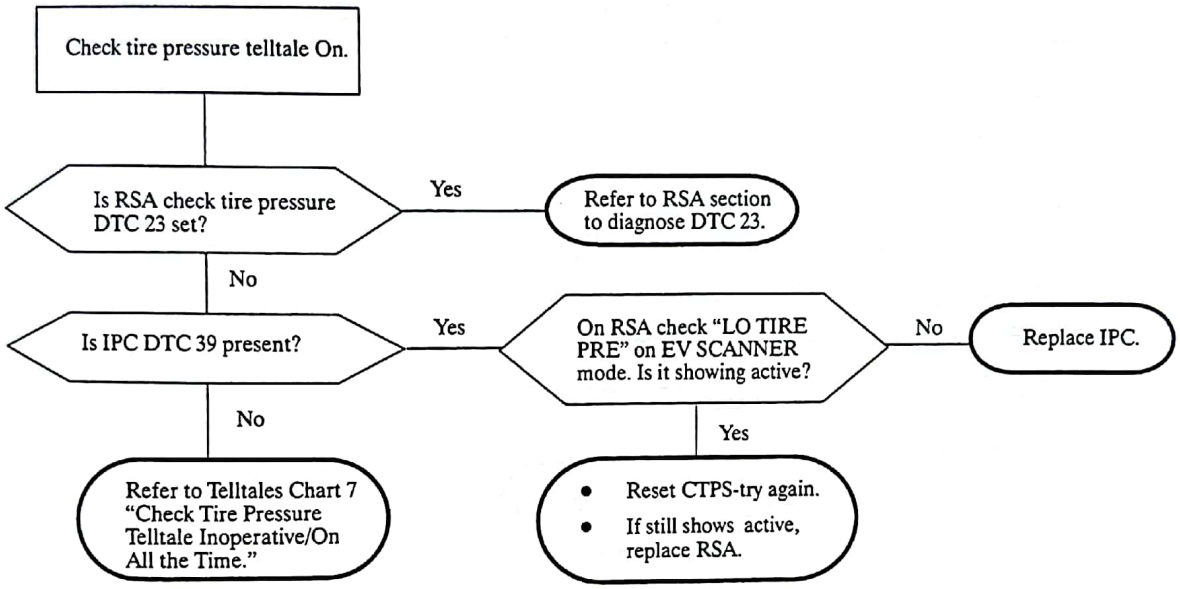
CHECK TIRE PRESSURE TELLTALE ON

CHART 1



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TIRE LOW OR FLAT WITH NO CHECK TIRE PRESSURE TELLTALE

CHART 2

Tire low or flat with no check tire pressure telltale.

Have you referred to " Tire Pressure System Operation"?

No → Refer to "Tire Pressure System Operation."

Yes

- Record tire pressure of all four tires.
- Repair low tire condition.
- Set all four tires to 345 kPa (50 psi).

Put vehicle in Run mode - does check tire pressure telltale come On during bulb check?

No → Go to next page.

Yes

Are any BTCM DTCs set?

Yes → Diagnose BTCM DTCs.

No

Is RSA DTC 23 set?

Yes → Replace RSA.

No

Reset check tire pressure system. Refer to System Reset and Calibration in this service manual.

Drive the vehicle between 24–64 km/h (15–40 mph) on a smooth straight road. On PDT in EV SCANNER check RSA General Information parameter LOW TIRE. While driving it reads ...

Calibrate or Cal-monitor.

Refer to "System Reset and Calibration." If the vehicle is driven far enough under the right conditions in the right speed ranges, the parameter should change from "calibrate" to "detection." This means the system is now starting to perform detection in that speed range.

Initialize

- Check for stuck/shorted low tire pressure switch.
- Check circuit 1055 from RSA pin D4 to low tire pressure switch for short to ground.
- If switch and circuit ok, replace RSA.

No Stable Speed

Road conditions prevent calibration - refer to "System Reset and Calibration."

No Valid Data

Wheel speed data may not be stable or may be invalid.

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

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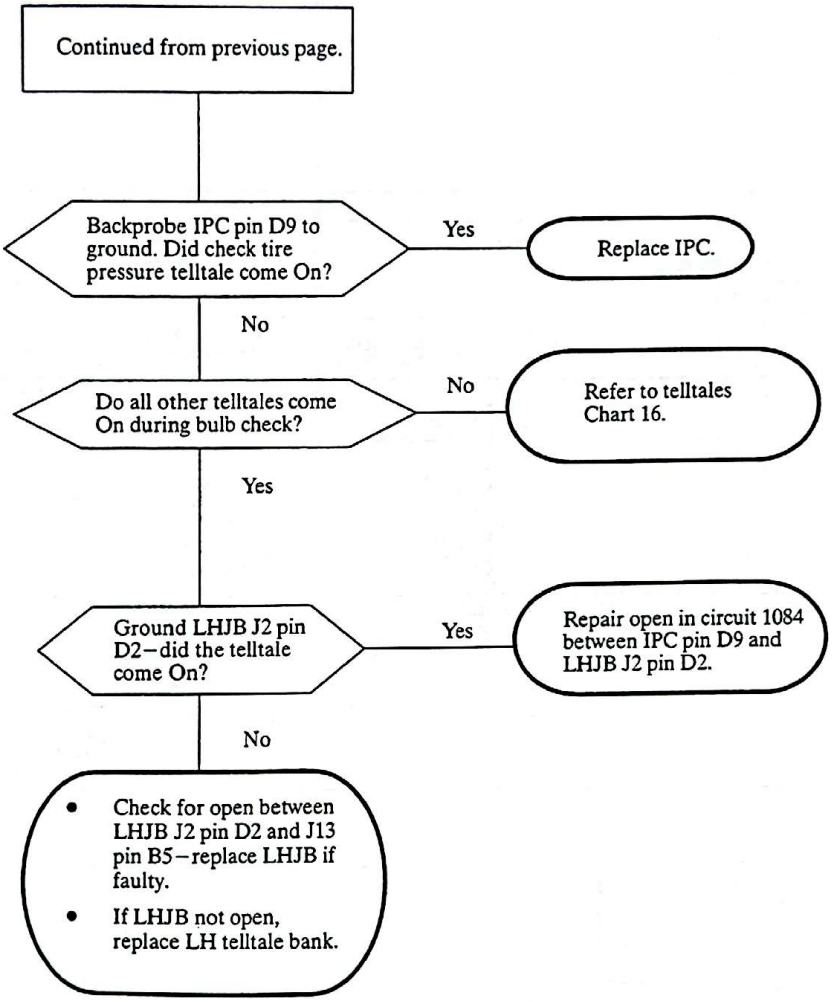
TIRE LOW OR FLAT WITH NO CHECK TIRE PRESSURE TELLTALE –CONTINUED

CHART 2



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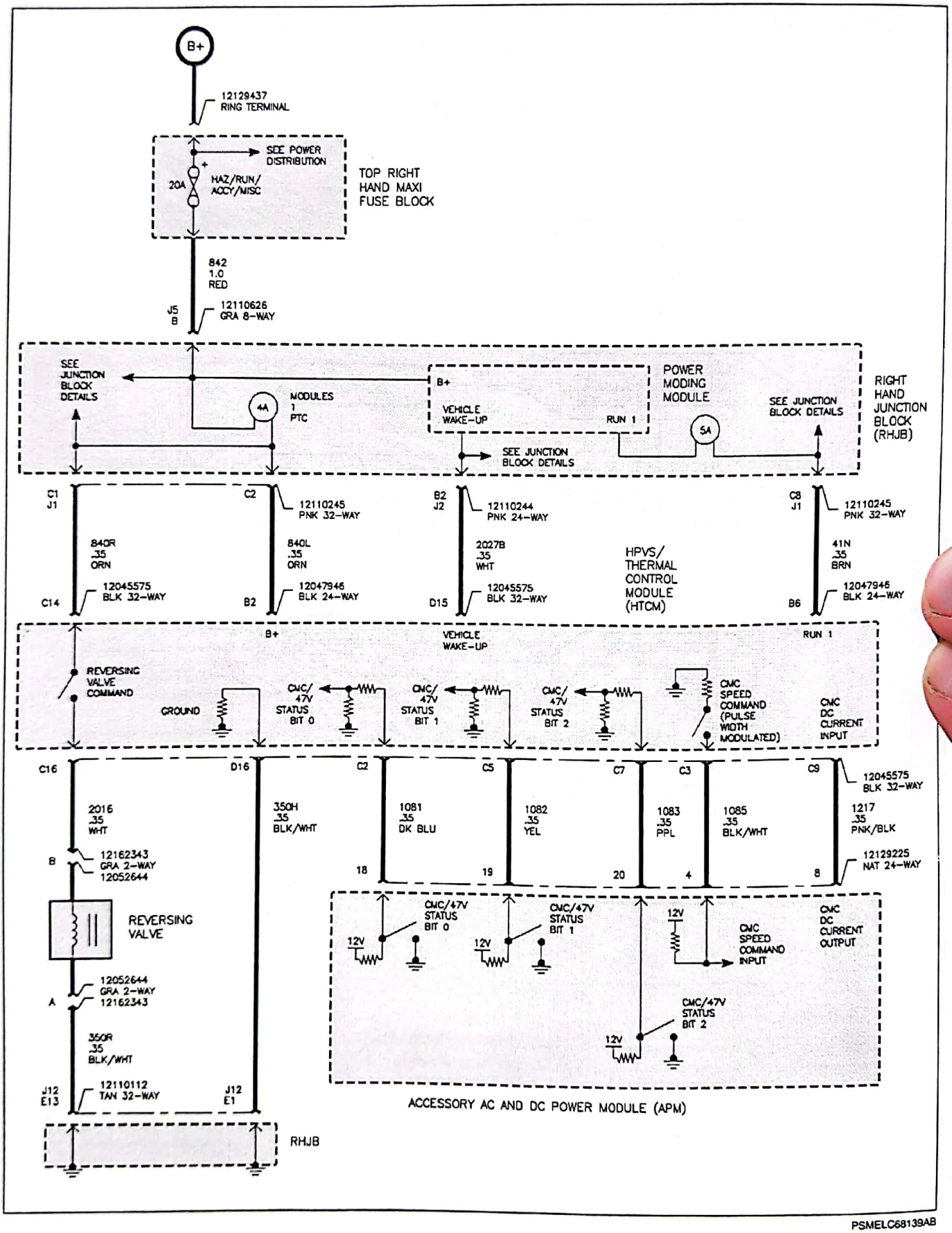
CLIMATE CONTROL



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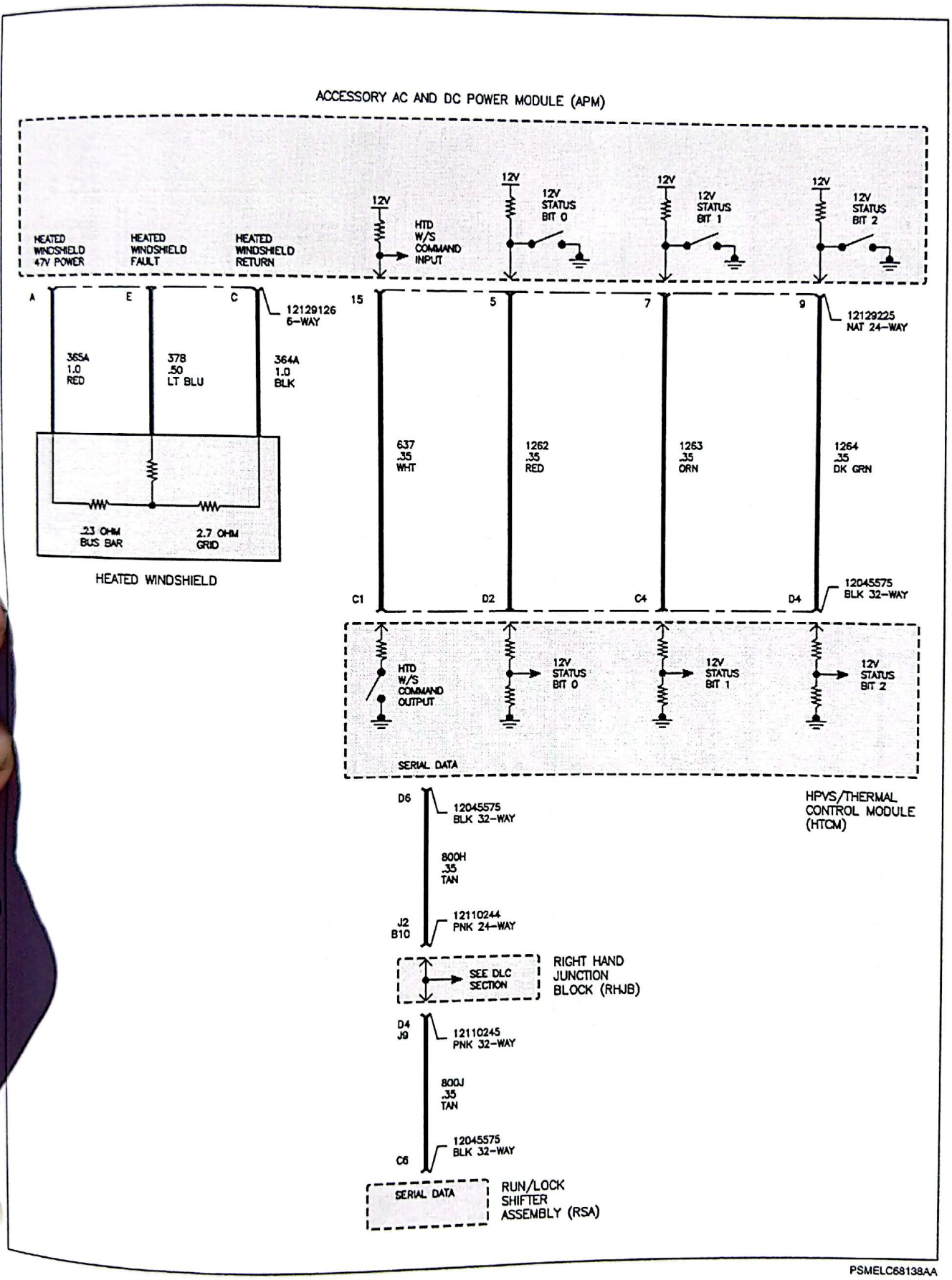

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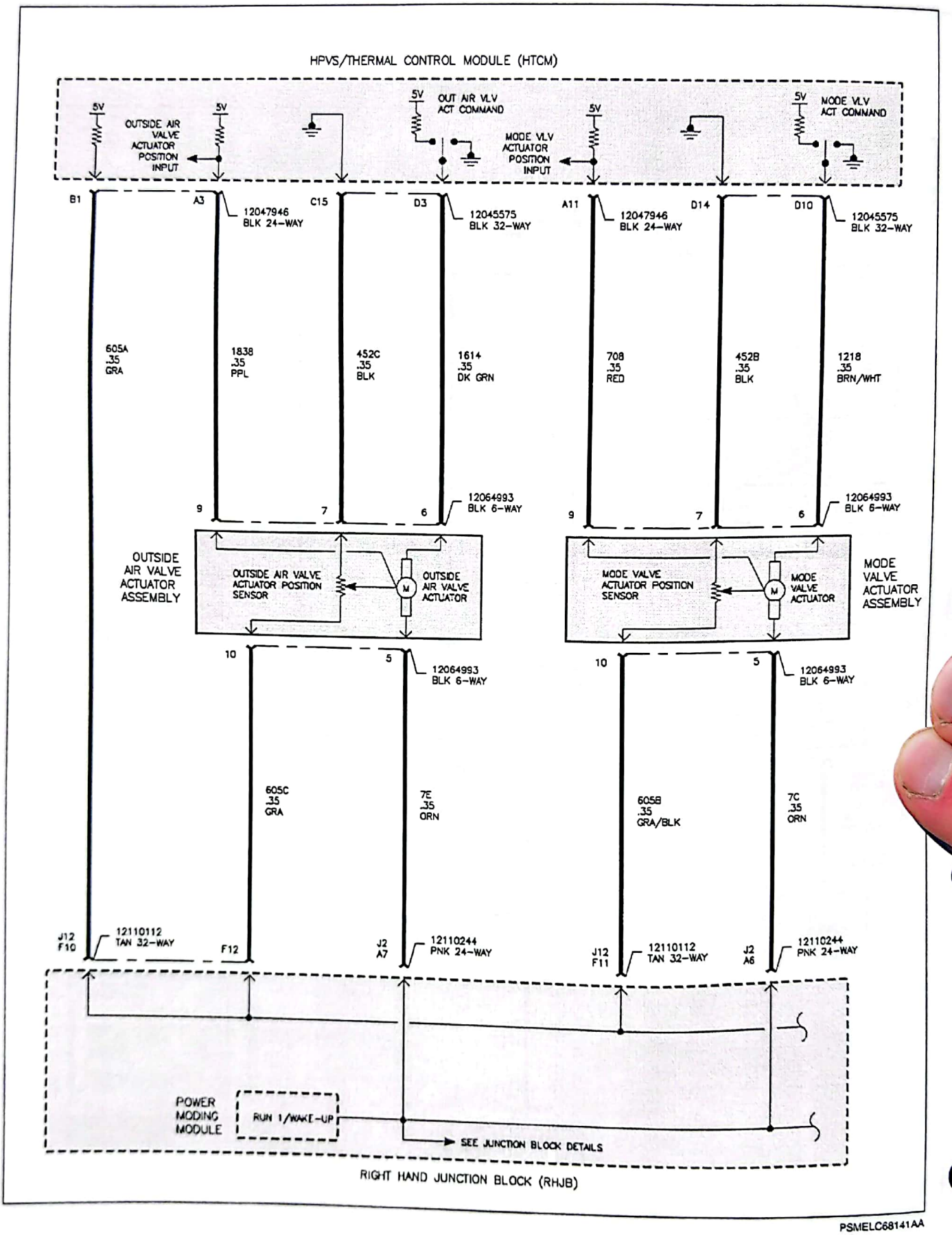

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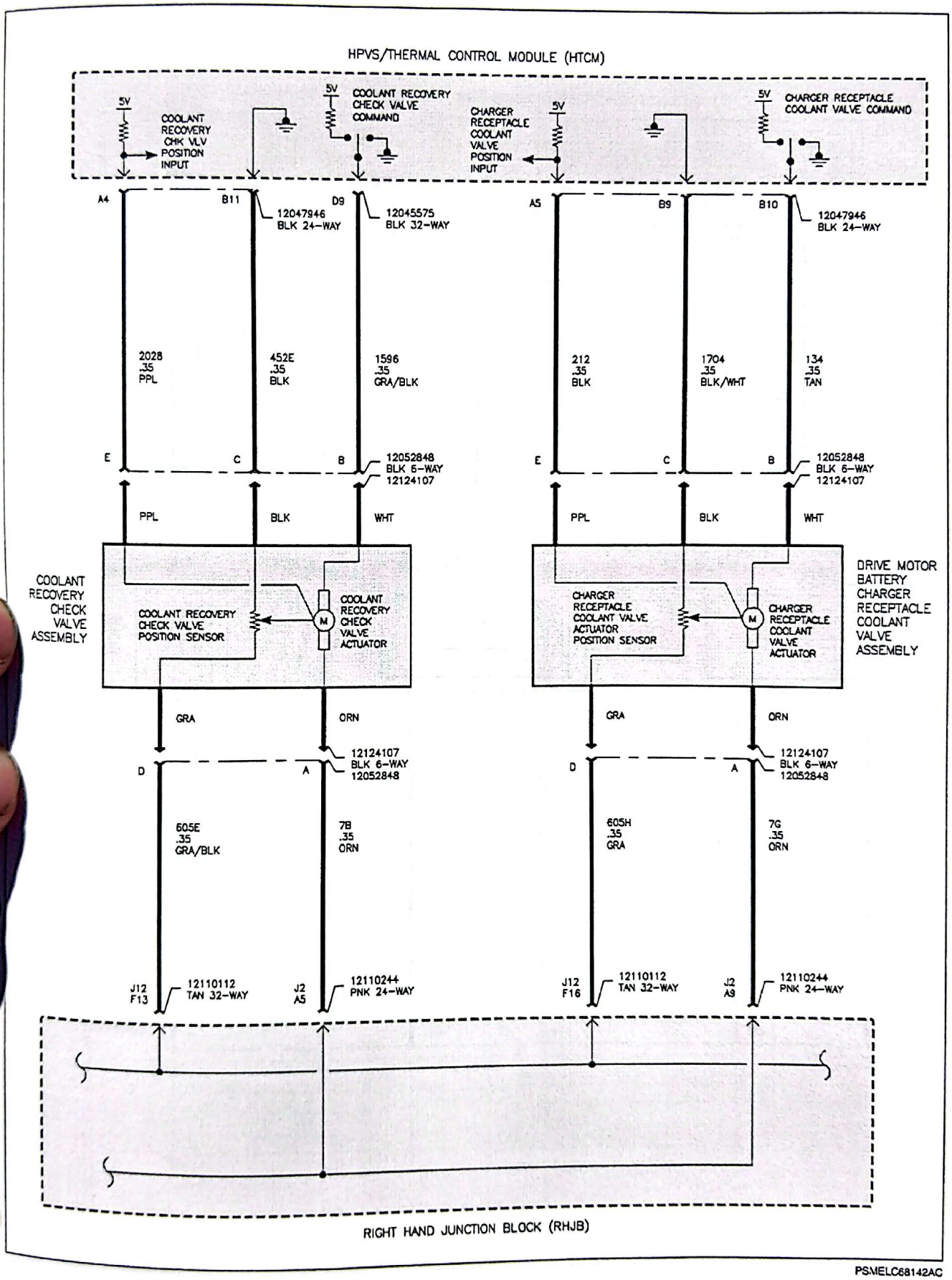

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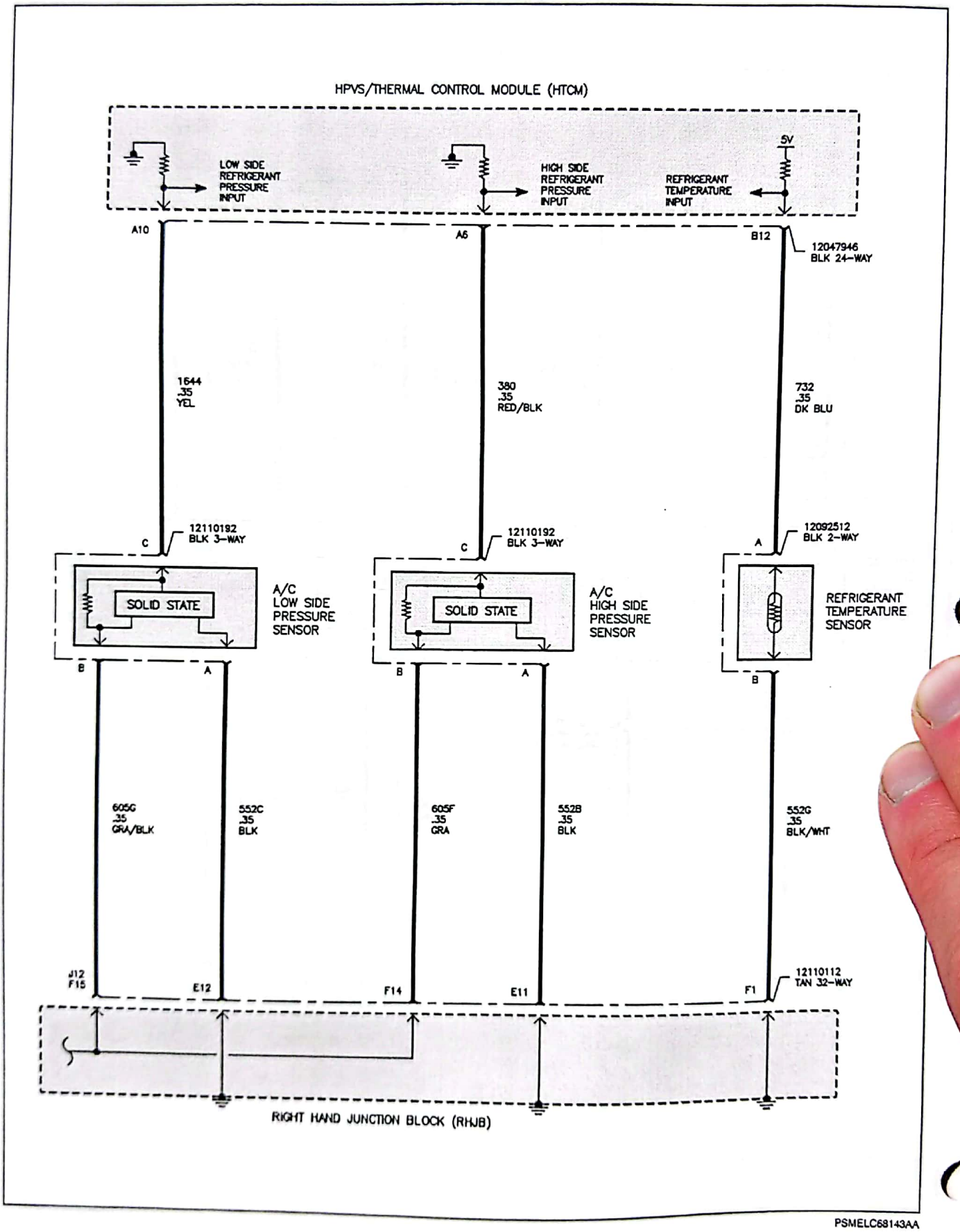

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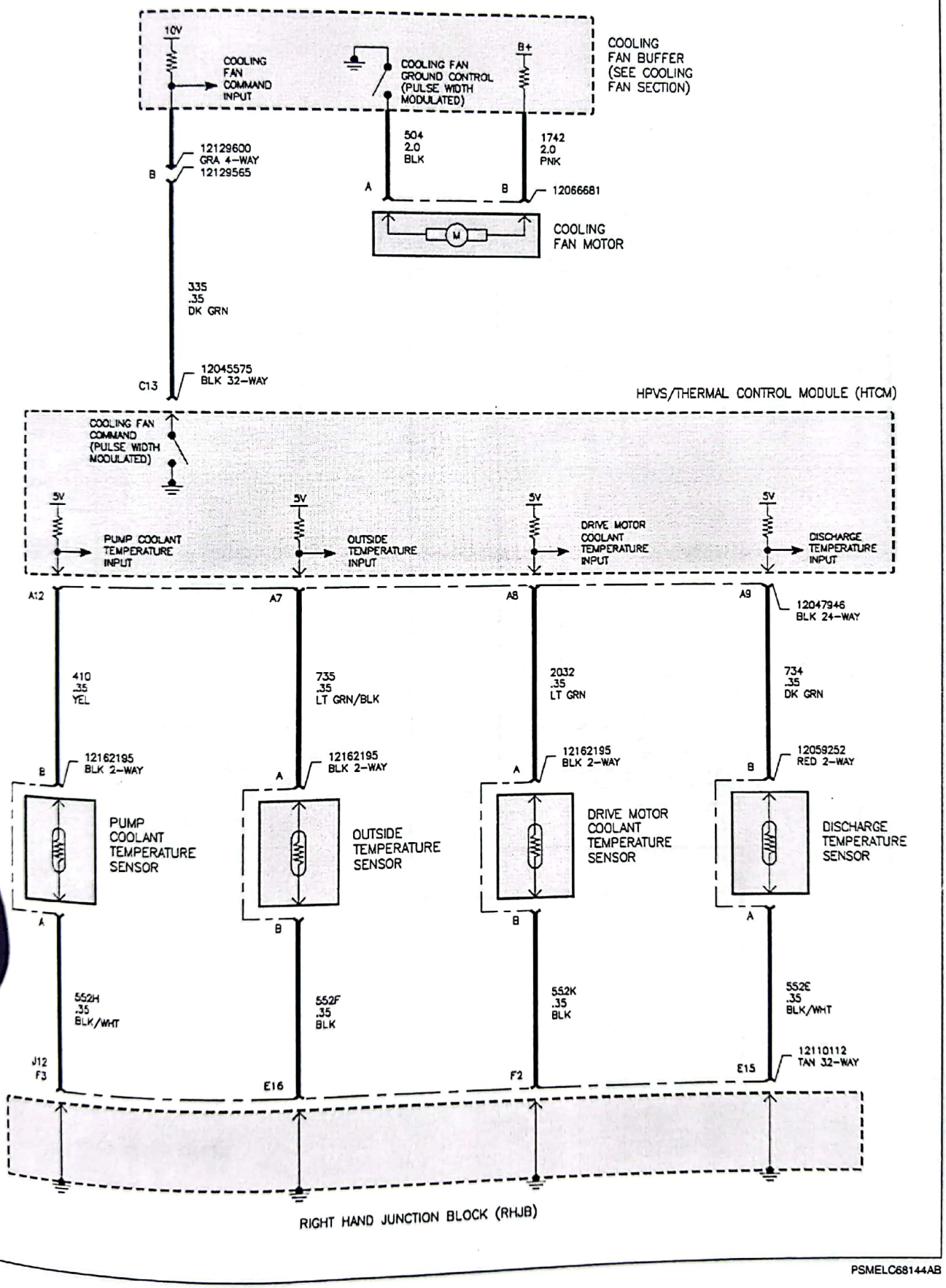

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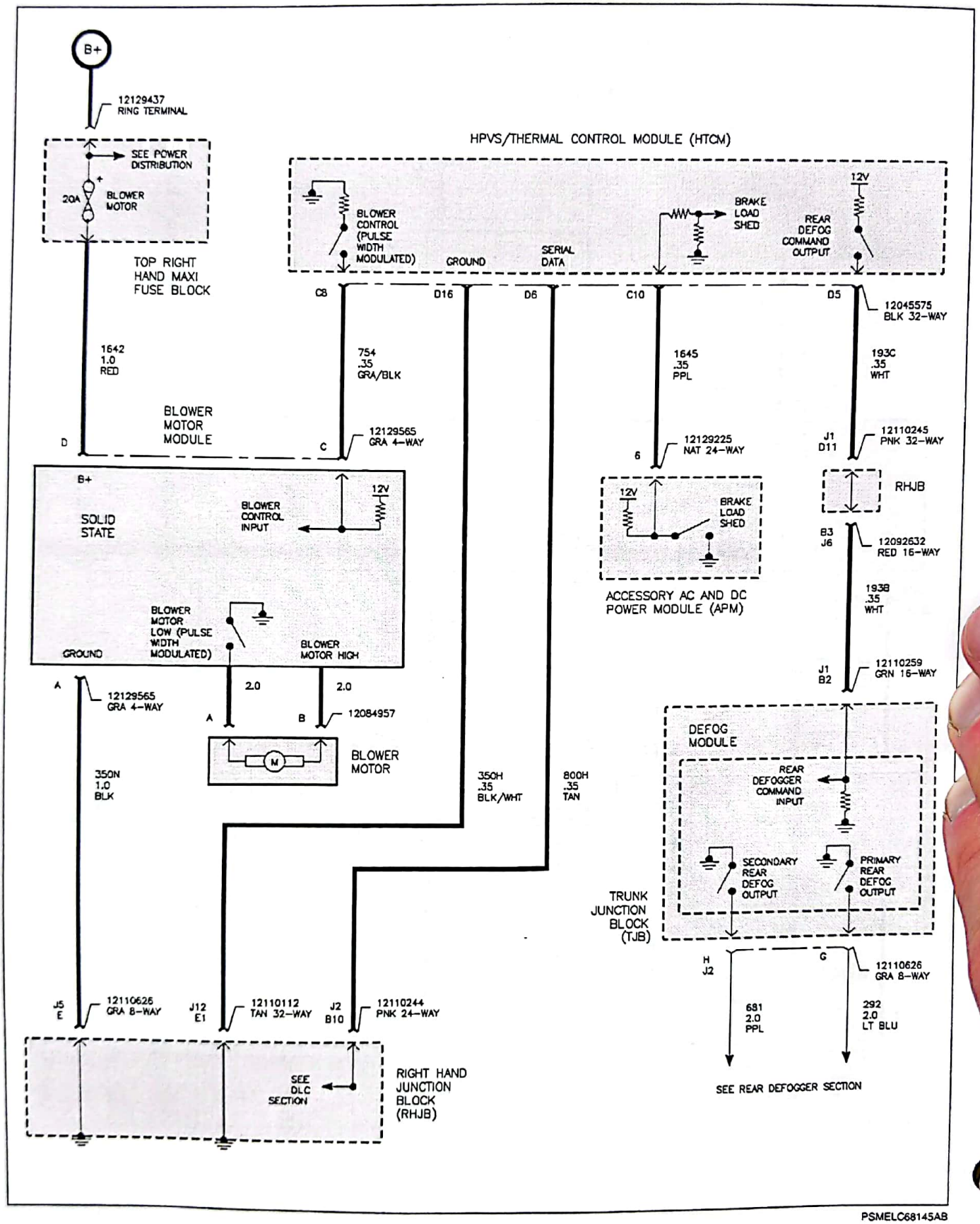
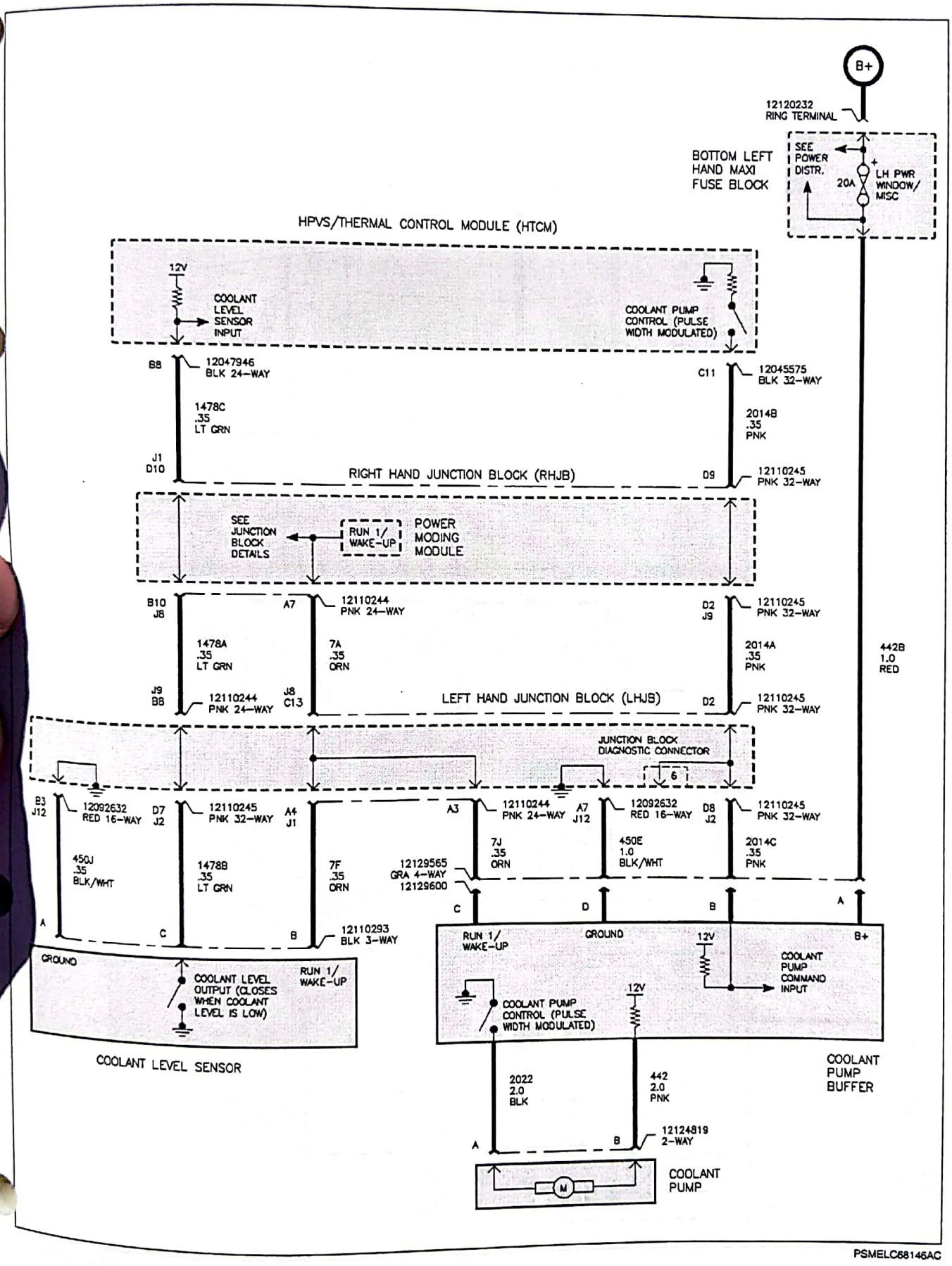

B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION
20A
BLOWER MOTOR
TOP RIGHT HAND MAXI FUSE BLOCK
HPVS/THERMAL CONTROL MODULE (HTCM)
BLOWER CONTROL (PULSE WIDTH MODULATED)
GROUND
SERIAL DATA
BRAKE LOAD SHED
REAR DEFOG COMMAND OUTPUT
12V
C8
D16
D6
C10
D5
12045575
BLK 32-WAY
1642
1.0
RED
754
.35
GRA/BLK
1645
.35
PPL
193C
.35
WHT
BLOWER MOTOR MODULE
D
C
12129565
GRA 4-WAY
6
12129225
NAT 24-WAY
J1
D11
12110245
PNK 32-WAY
B+
SOLID STATE
BLOWER CONTROL INPUT
12V
BRAKE LOAD SHED
RHJB
B3
J6
12092632
RED 16-WAY
BLOWER MOTOR LOW (PULSE WIDTH MODULATED)
GROUND
BLOWER MOTOR HIGH
1938
.35
WHT
ACCESSORY AC AND DC POWER MODULE (APM)
J1
B2
12110259
GRN 16-WAY
A
12129565
GRA 4-WAY
2.0
2.0
A
B
12084957
M
BLOWER MOTOR
DEFOG MODULE
REAR DEFOGGER COMMAND INPUT
350N
1.0
BLK
350H
.35
BLK/WHT
800H
.35
TAN
SECONDARY REAR DEFOG OUTPUT
PRIMARY REAR DEFOG OUTPUT
TRUNK JUNCTION BLOCK (TJB)
H
J2
G
12110626
GRA 8-WAY
681
2.0
PPL
292
2.0
LT BLU
J5
E
12110626
GRA 8-WAY
J12
E1
12110112
TAN 32-WAY
J2
B10
12110244
PNK 24-WAY
SEE REAR DEFOGGER SECTION
SEE DLC SECTION
RIGHT HAND JUNCTION BLOCK (RHJB)
PSMELC68145AB


B+
12120232
RING TERMINAL
BOTTOM LEFT
HAND MAXI
FUSE BLOCK
SEE
POWER
DISTR.
20A
LH PWR
WINDOW/
MISC
HPVS/THERMAL CONTROL MODULE (HTCM)
12V
COOLANT
LEVEL
SENSOR
INPUT
COOLANT PUMP
CONTROL (PULSE
WIDTH MODULATED)
B8
12047946
BLK 24-WAY
1478C
.35
LT GRN
J1
D10
C11
12045575
BLK 32-WAY
2014B
.35
PNK
RIGHT HAND JUNCTION BLOCK (RHJB)
D9
12110245
PNK 32-WAY
SEE
JUNCTION
BLOCK
DETAILS
RUN 1/
WAKE-UP
POWER
MODING
MODULE
B10
J8
A7
12110244
PNK 24-WAY
1478A
.35
LT GRN
7A
.35
ORN
J9
B8
J8
C13
12110244
PNK 24-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
D2
J9
12110245
PNK 32-WAY
2014A
.35
PNK
442B
1.0
RED
D2
12110245
PNK 32-WAY
JUNCTION BLOCK
DIAGNOSTIC CONNECTOR
6
B3
J12
12092632
RED 16-WAY
D7
J2
12110245
PNK 32-WAY
A4
J1
A3
12110244
PNK 24-WAY
A7
J12
12092632
RED 16-WAY
D8
J2
12110245
PNK 32-WAY
450J
.35
BLK/WHT
1478B
.35
LT GRN
7F
.35
ORN
12129565
GRA 4-WAY
12129600
7J
.35
ORN
450E
1.0
BLK/WHT
2014C
.35
PNK
A
C
B
12110293
BLK 3-WAY
C
D
B
A
GROUND
COOLANT LEVEL
OUTPUT (CLOSES
WHEN COOLANT
LEVEL IS LOW)
RUN 1/
WAKE-UP
COOLANT LEVEL SENSOR
RUN 1/
WAKE-UP
GROUND
12V
B+
COOLANT
PUMP
COMMAND
INPUT
12V
COOLANT PUMP
CONTROL (PULSE
WIDTH MODULATED)
COOLANT
PUMP
BUFFER
2022
2.0
BLK
442
2.0
PNK
A
B
12124819
2-WAY
M
COOLANT
PUMP
PSMELC68146AC

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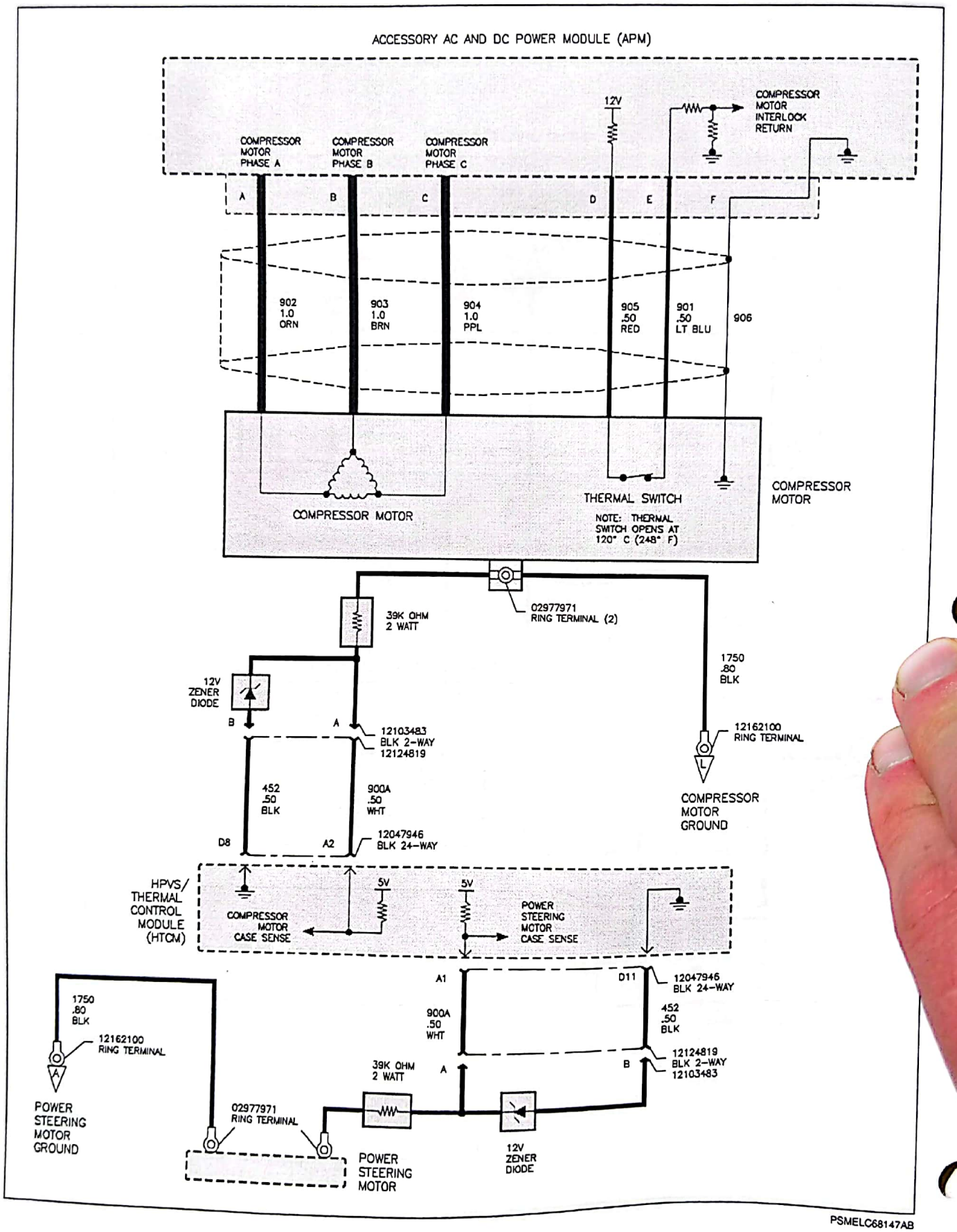
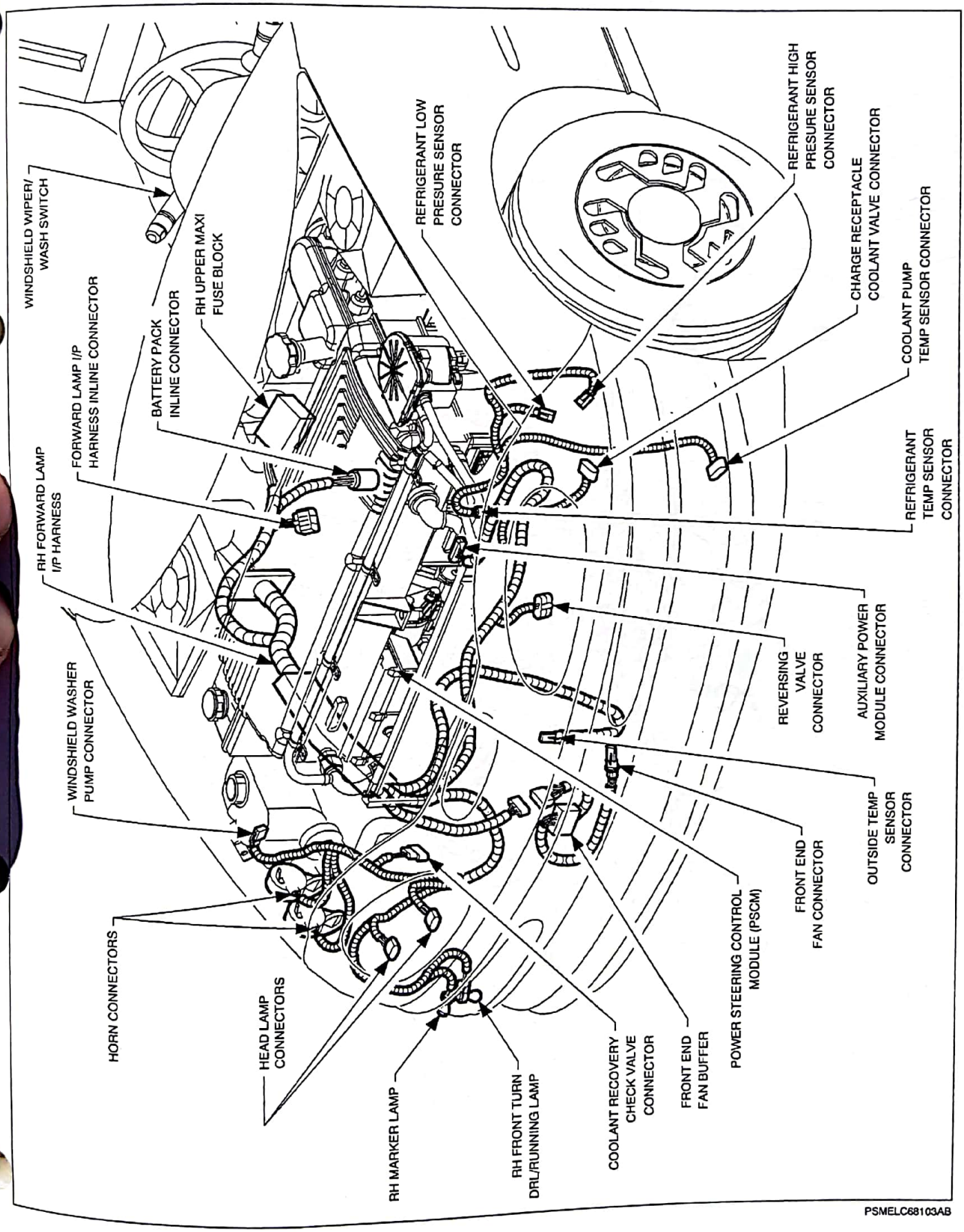
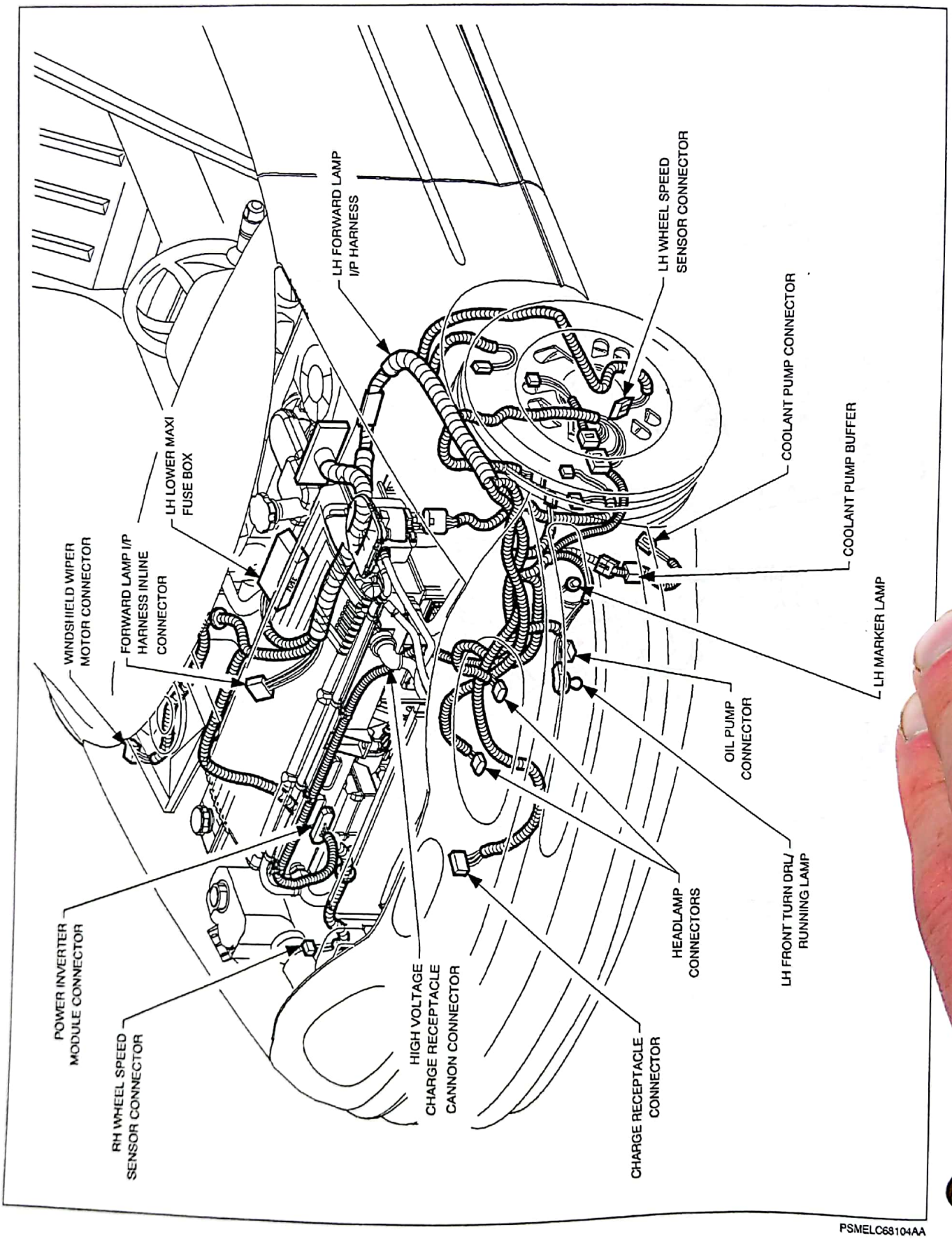

ACCESSORY AC AND DC POWER MODULE (APM)
12V
COMPRESSOR MOTOR INTERLOCK RETURN
COMPRESSOR MOTOR PHASE A
COMPRESSOR MOTOR PHASE B
COMPRESSOR MOTOR PHASE C
A
B
C
D
E
F
902 1.0 ORN
903 1.0 BRN
904 1.0 PPL
905 .50 RED
901 .50 LT BLU
906
COMPRESSOR MOTOR
THERMAL SWITCH
NOTE: THERMAL SWITCH OPENS AT 120° C (248° F)
COMPRESSOR MOTOR
02977971 RING TERMINAL (2)
39K OHM 2 WATT
12V ZENER DIODE
1750 .80 BLK
12103483 BLK 2-WAY 12124819
12162100 RING TERMINAL
452 .50 BLK
900A .50 WHT
D8
A2
12047946 BLK 24-WAY
COMPRESSOR MOTOR GROUND
HPVS/ THERMAL CONTROL MODULE (HTCM)
COMPRESSOR MOTOR CASE SENSE
5V
5V
POWER STEERING MOTOR CASE SENSE
A1
D11
12047946 BLK 24-WAY
900A .50 WHT
452 .50 BLK
12124819 BLK 2-WAY 12103483
39K OHM 2 WATT
1750 .80 BLK
12162100 RING TERMINAL
POWER STEERING MOTOR GROUND
02977971 RING TERMINAL
12V ZENER DIODE
POWER STEERING MOTOR
PSMELC68147AB

CLIMATE CONTROLS LOCATION VIEWS



CLIMATE CONTROLS LOCATION VIEWS (CONTINUED)



NOTES

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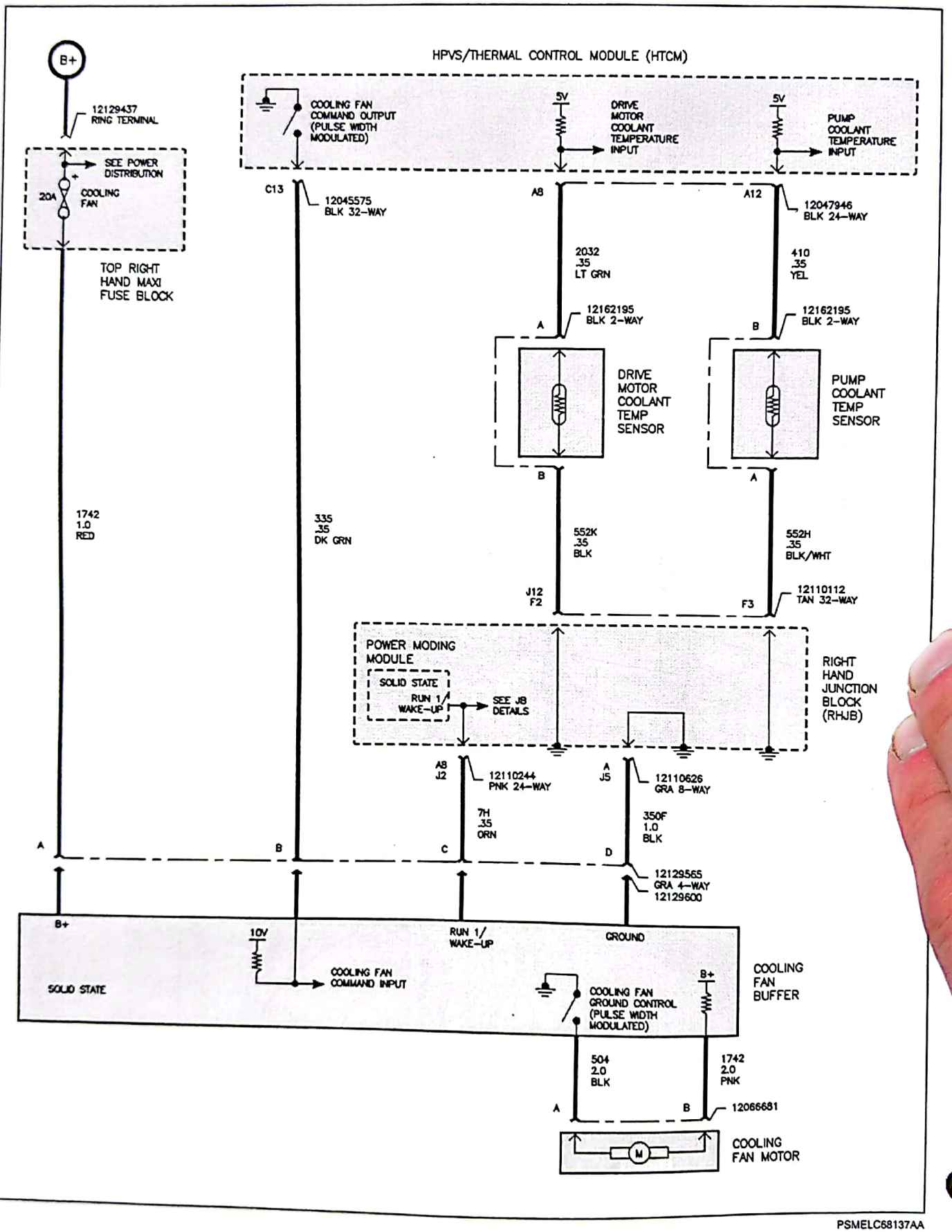
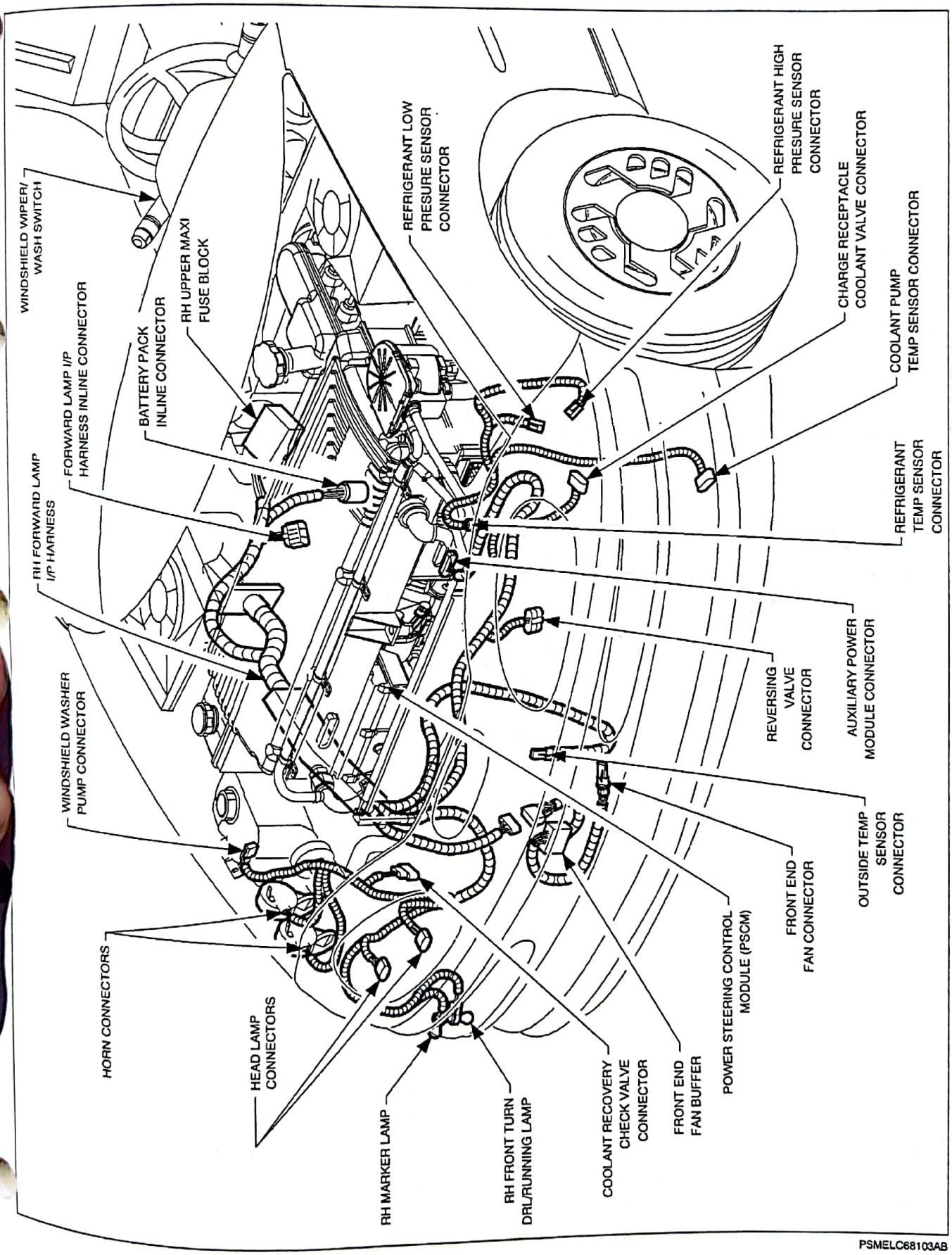
COOLING FAN

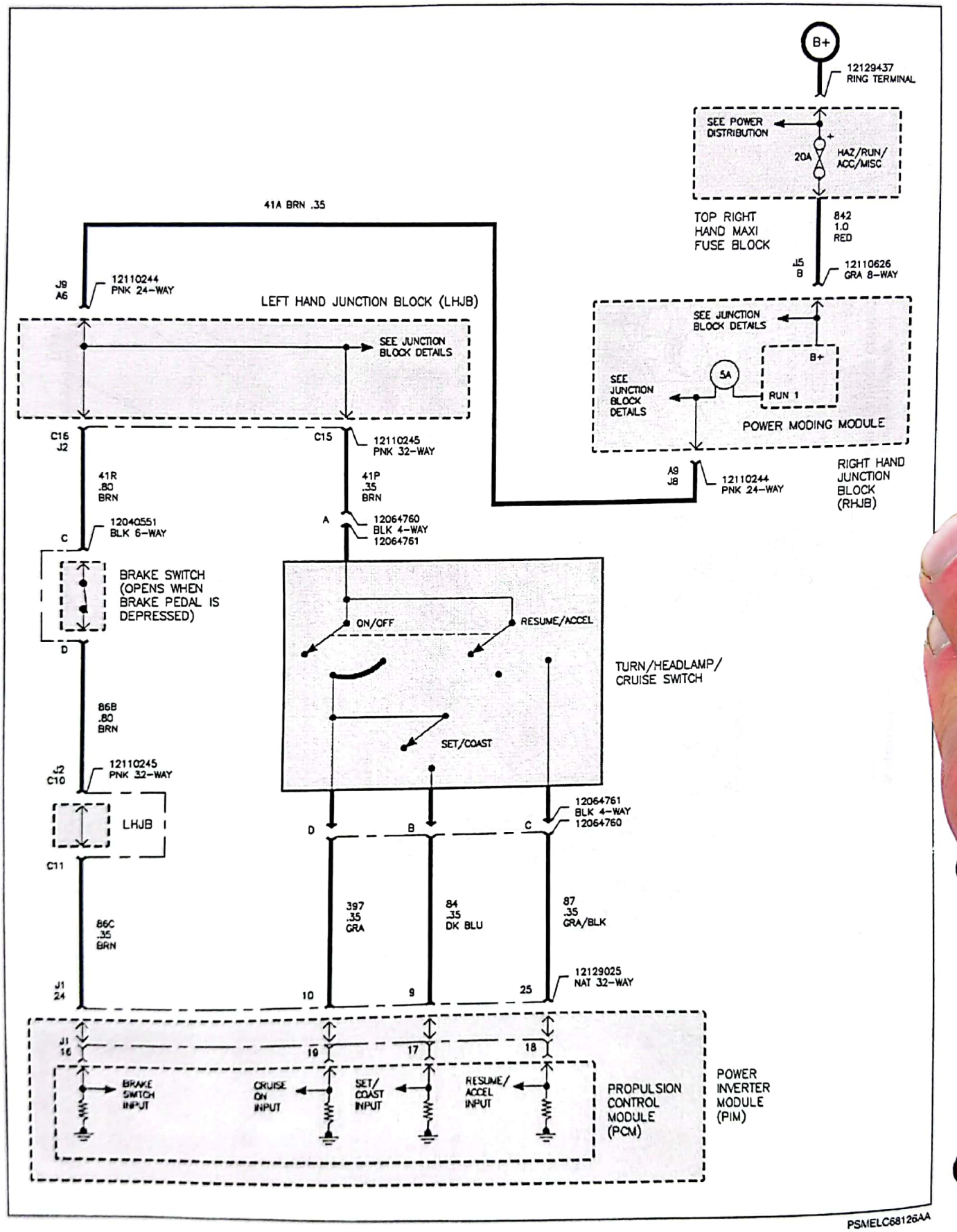


PSMELC68137AA

COOLING FAN COMPONENT LOCATION VIEW



CRUISE CONTROL



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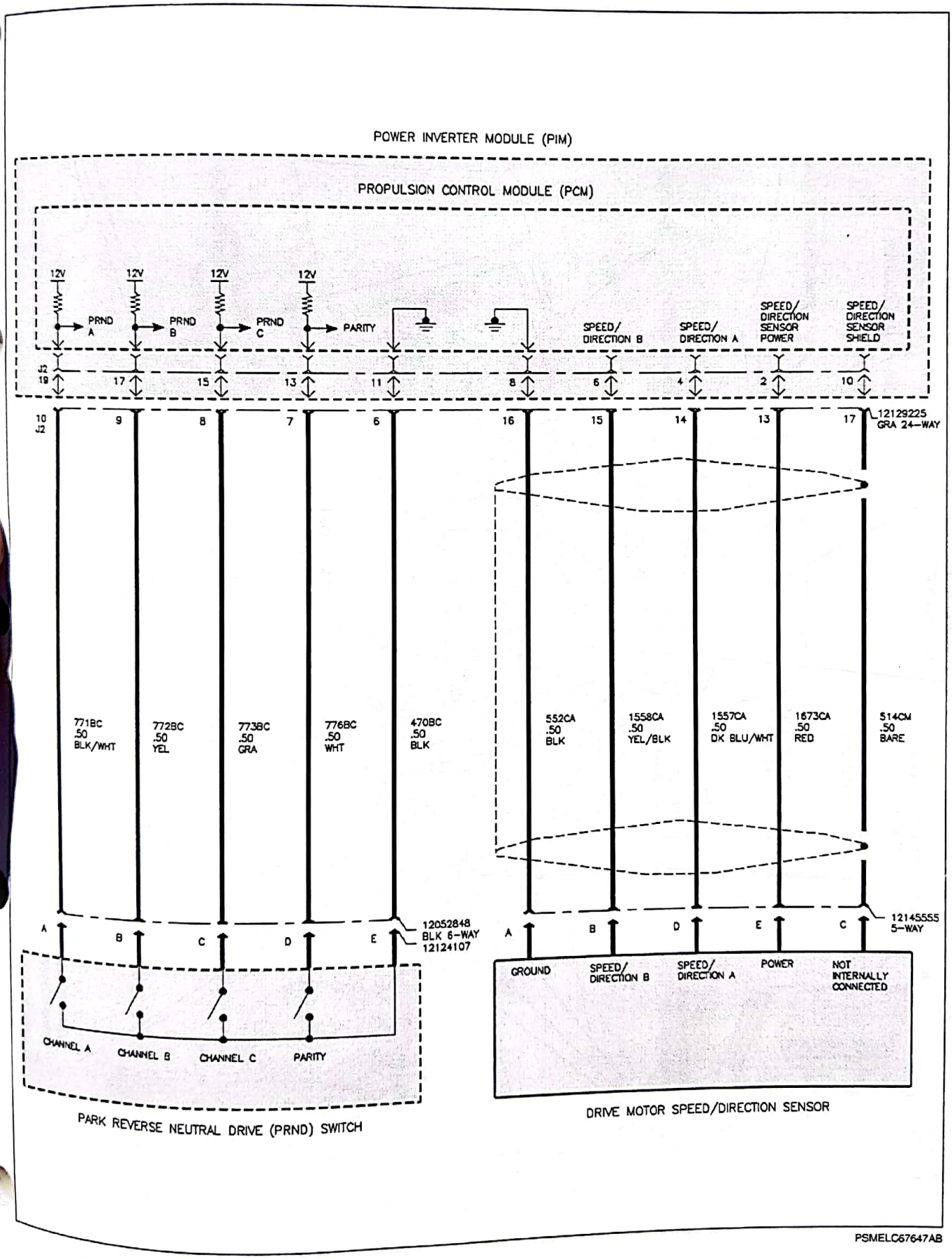

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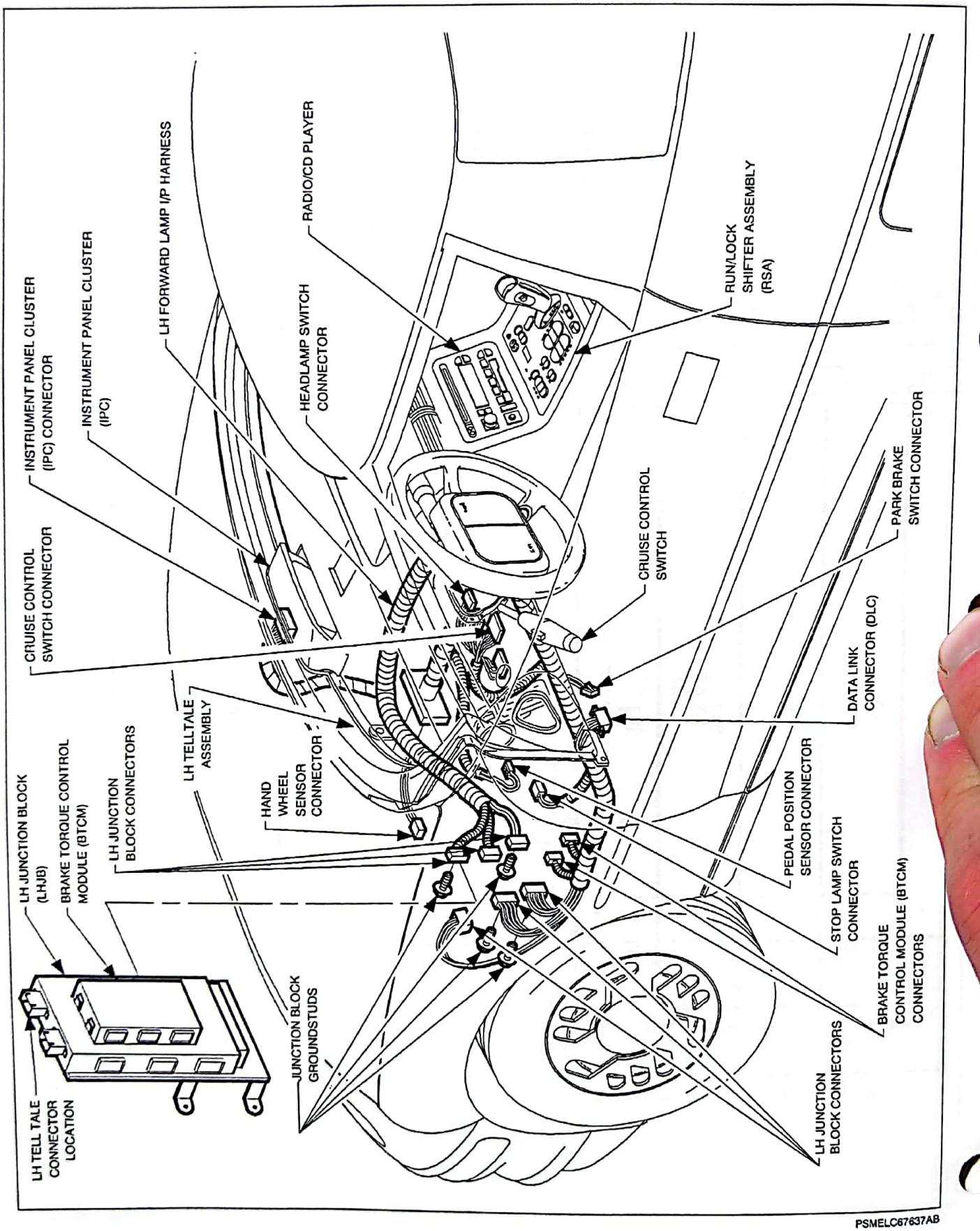
CRUISE CONTROL COMPONENT LOCATION VIEW



NOTES

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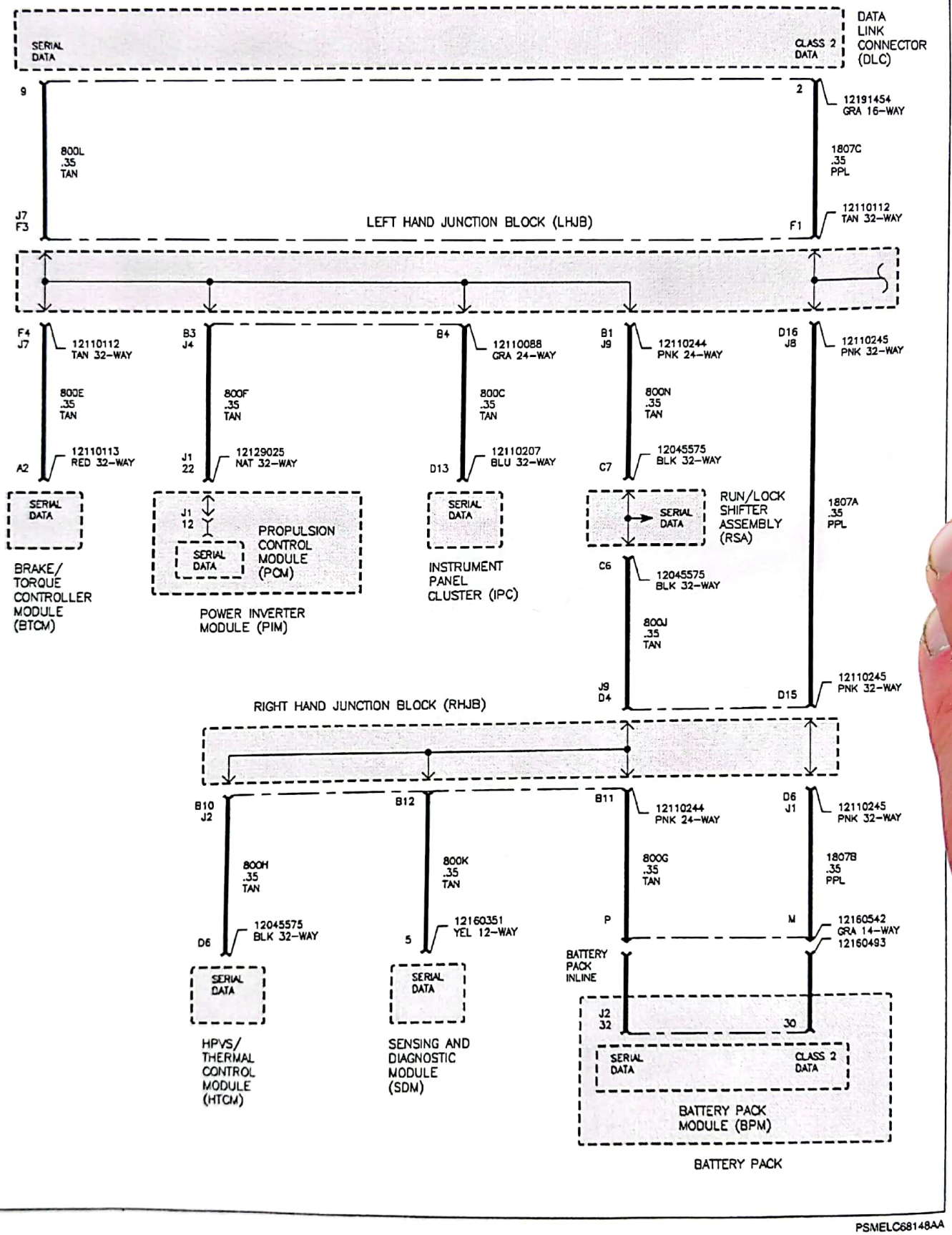
DATA LINK CONNECTOR



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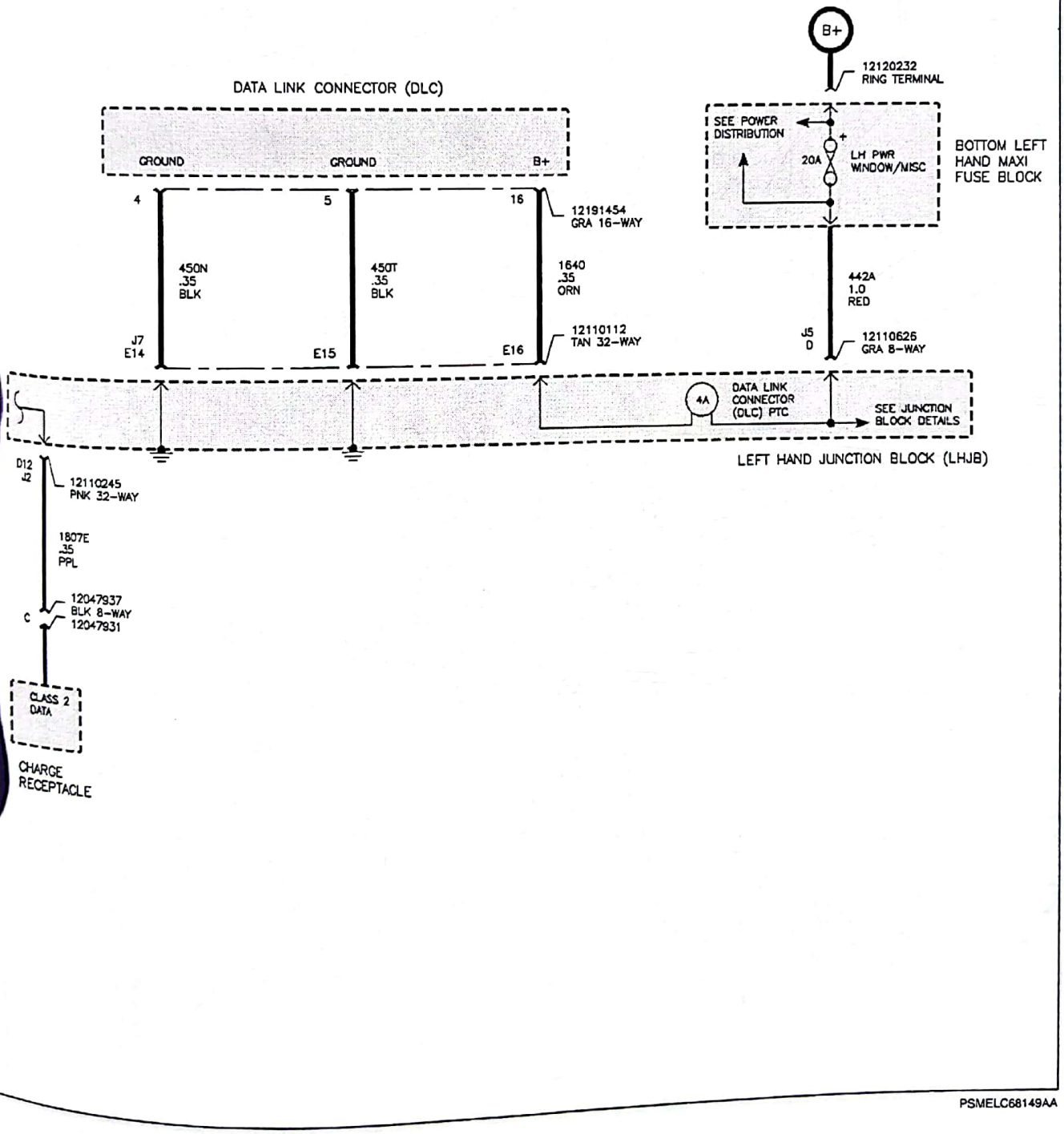

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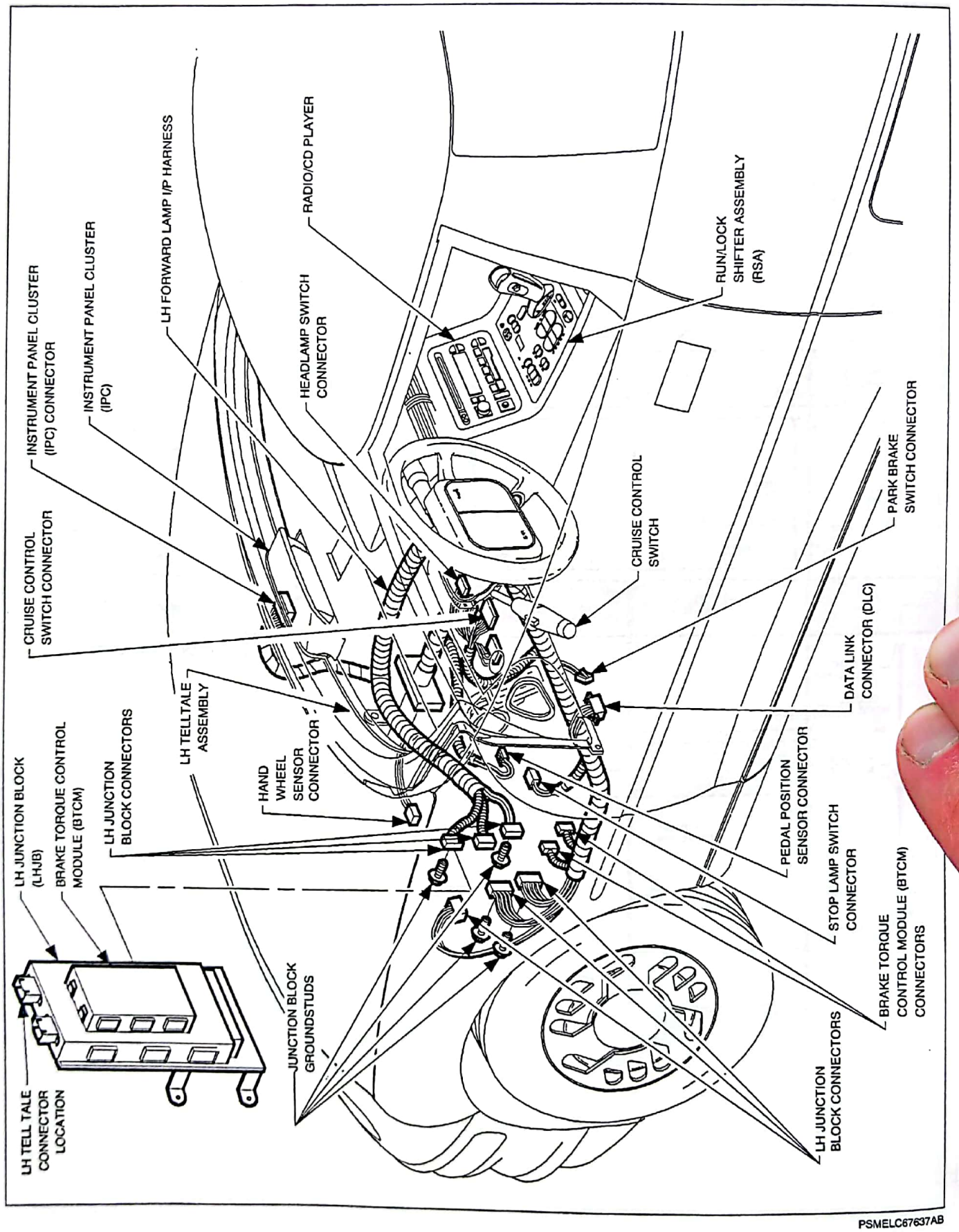
DATA LINK CONNECTOR COMPONENT LOCATION VIEW



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NOTES

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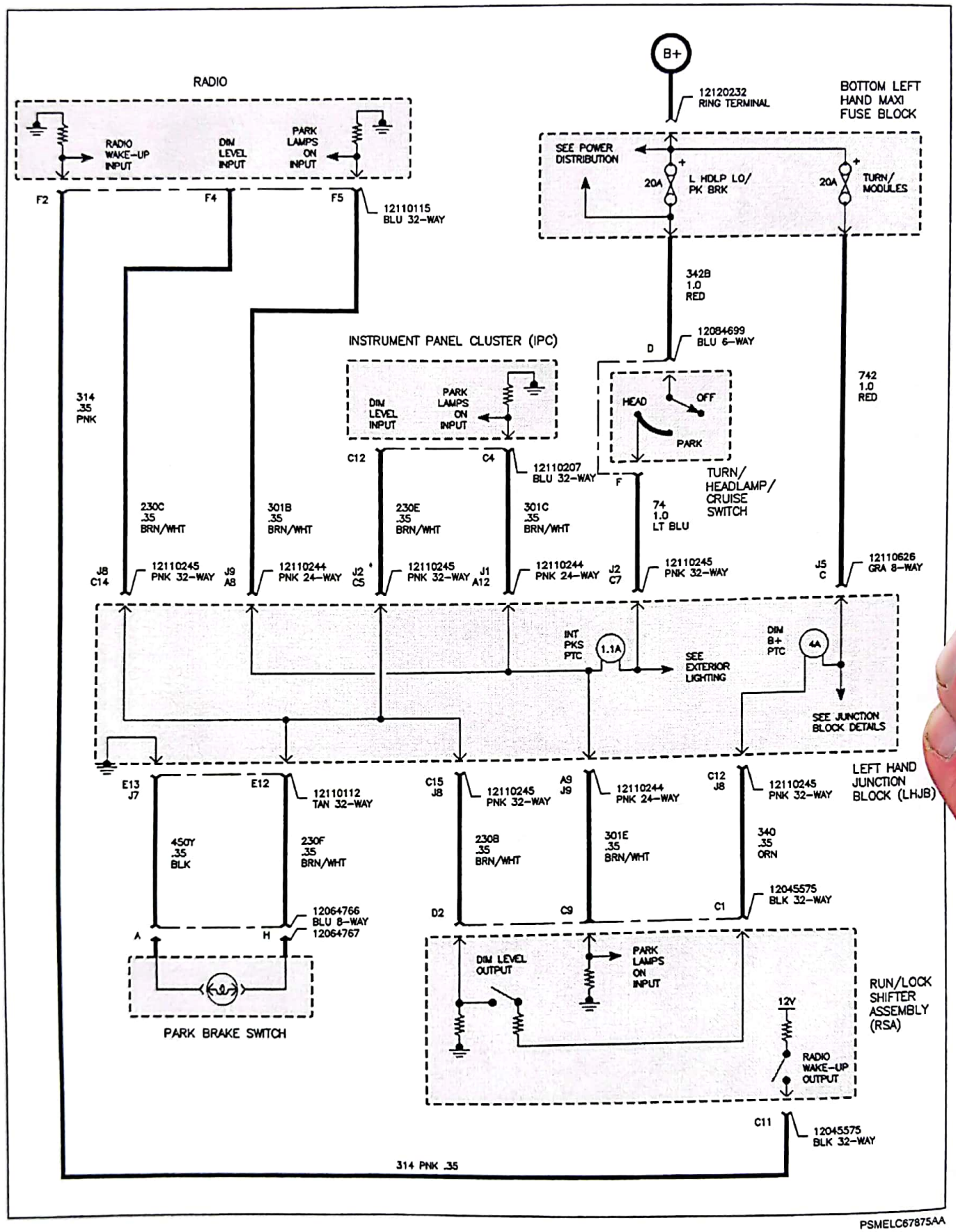
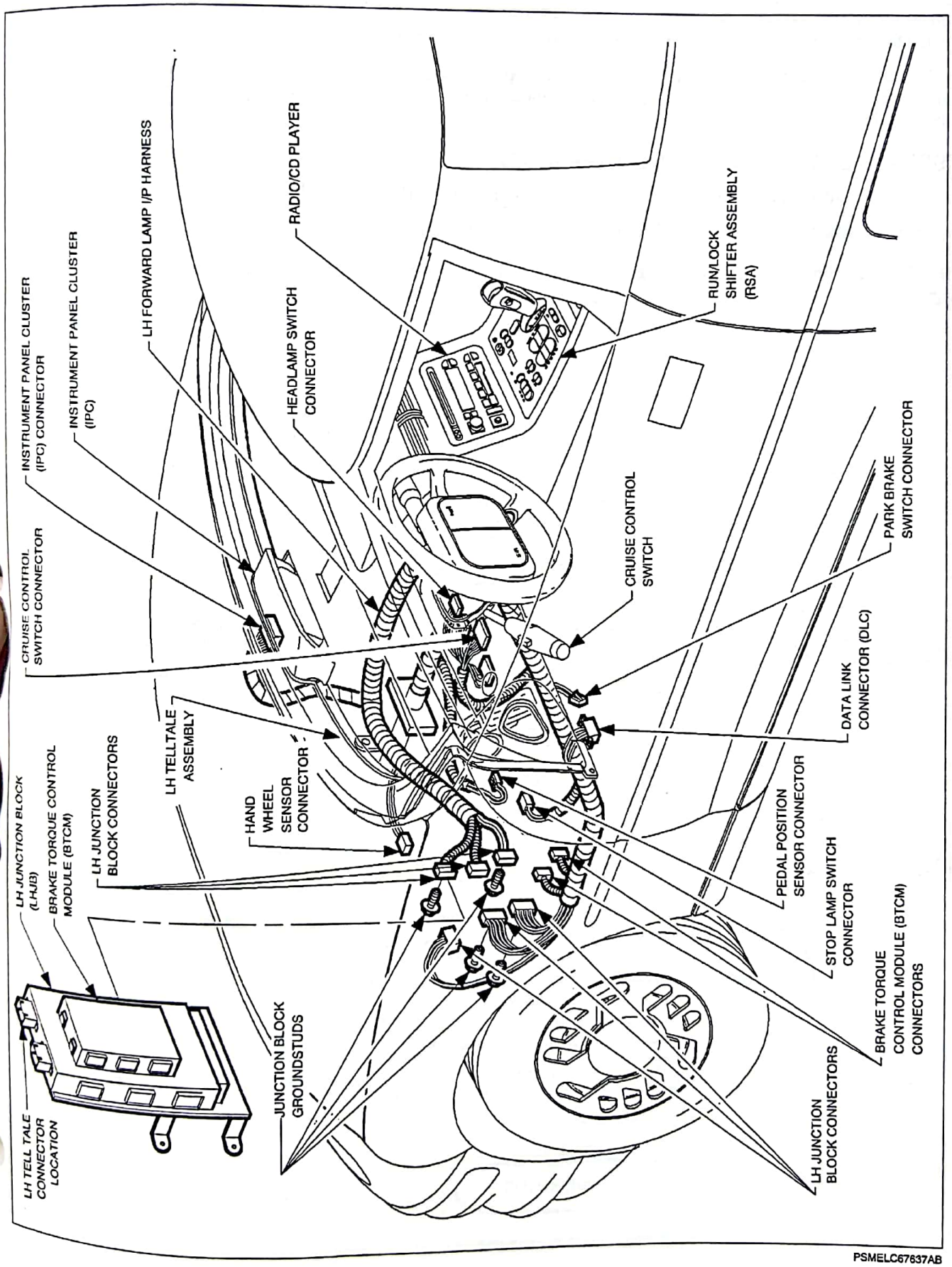
DIM ILLUMINATION LAMPS



DIM ILLUMINATION LAMPS COMPONENT LOCATION VIEW



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DISPLAYS DIMMING

Display backlighting is controlled by the run/lock shifter assembly (RSA). The RSA, instrument panel cluster (IPC), and radio receive voltage over circuit 301 when the park lamps are turned On. When the parklamps are On, the RSA controls the voltage on circuit 230 to control dimming of the radio, IPC, and park brake switch. There is an isolated internal feed for RSA backlighting, fed by circuit 301, but not affected by grounds on circuit 230.

The IPC creates little load on circuit 230 as it uses this input as a reference only, and actually powers the backlighting from another power source. However, the radio and park brake switch apply the voltage directly to the backlighting bulbs, drawing more current.

DISPLAYS DIMMING TROUBLE TREE INDEX

- Chart 1 – Displays Dark With Parklamps On (VF Dimming and Backlighting Inoperative)
- Chart 2 – Vacuum Fluorescent (VF) On Full, Incandescents Out All the Time

IMPORTANT: For displays staying in dim mode with light switch Off (park lamps will be On) refer to Exterior Lamp Diagnosis.

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DISPLAYS DARK WITH PARKLAMPS ON (VF DIMMING AND BACKLIGHTING INOPERATIVE)

CHART 1

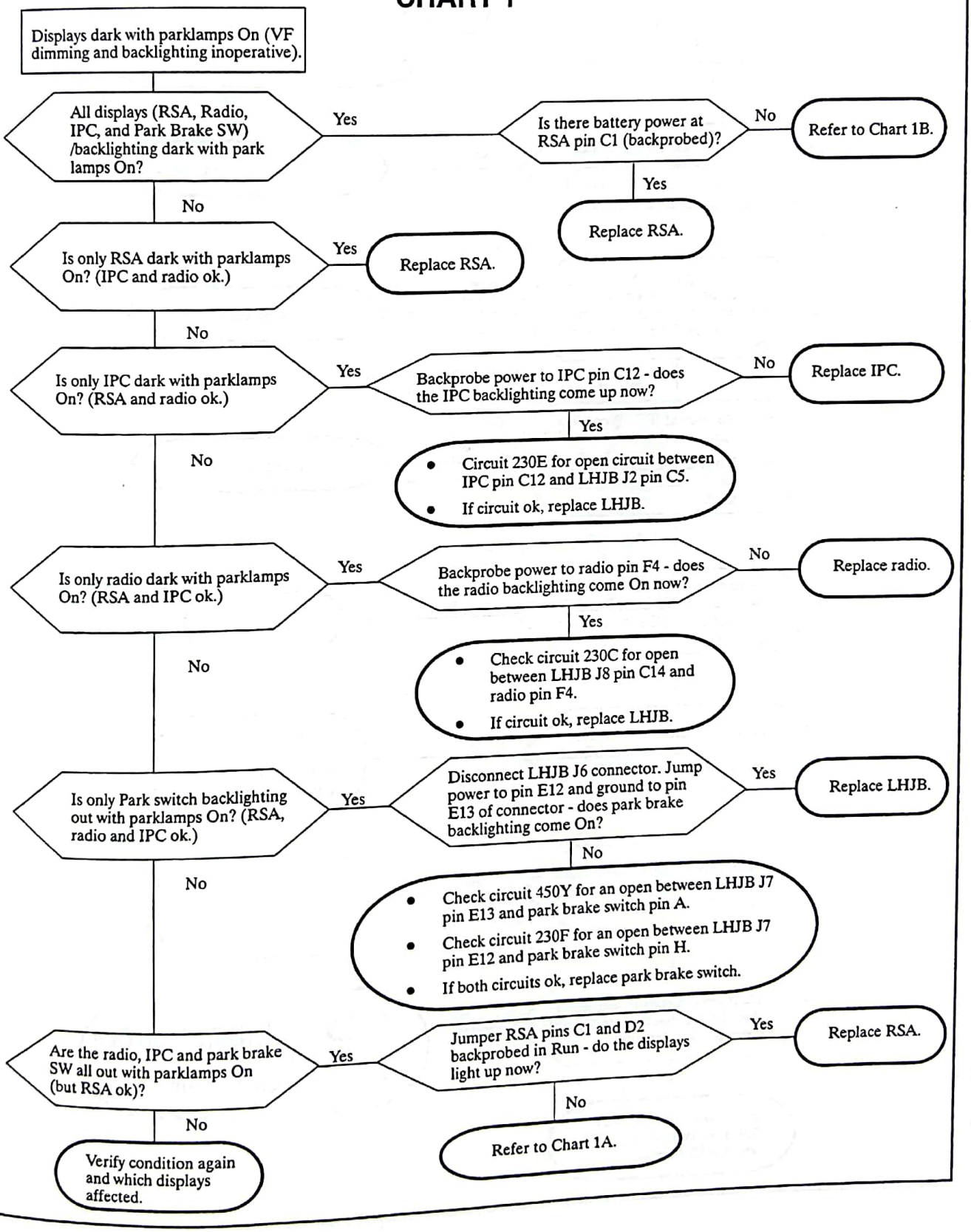

CHART 1A

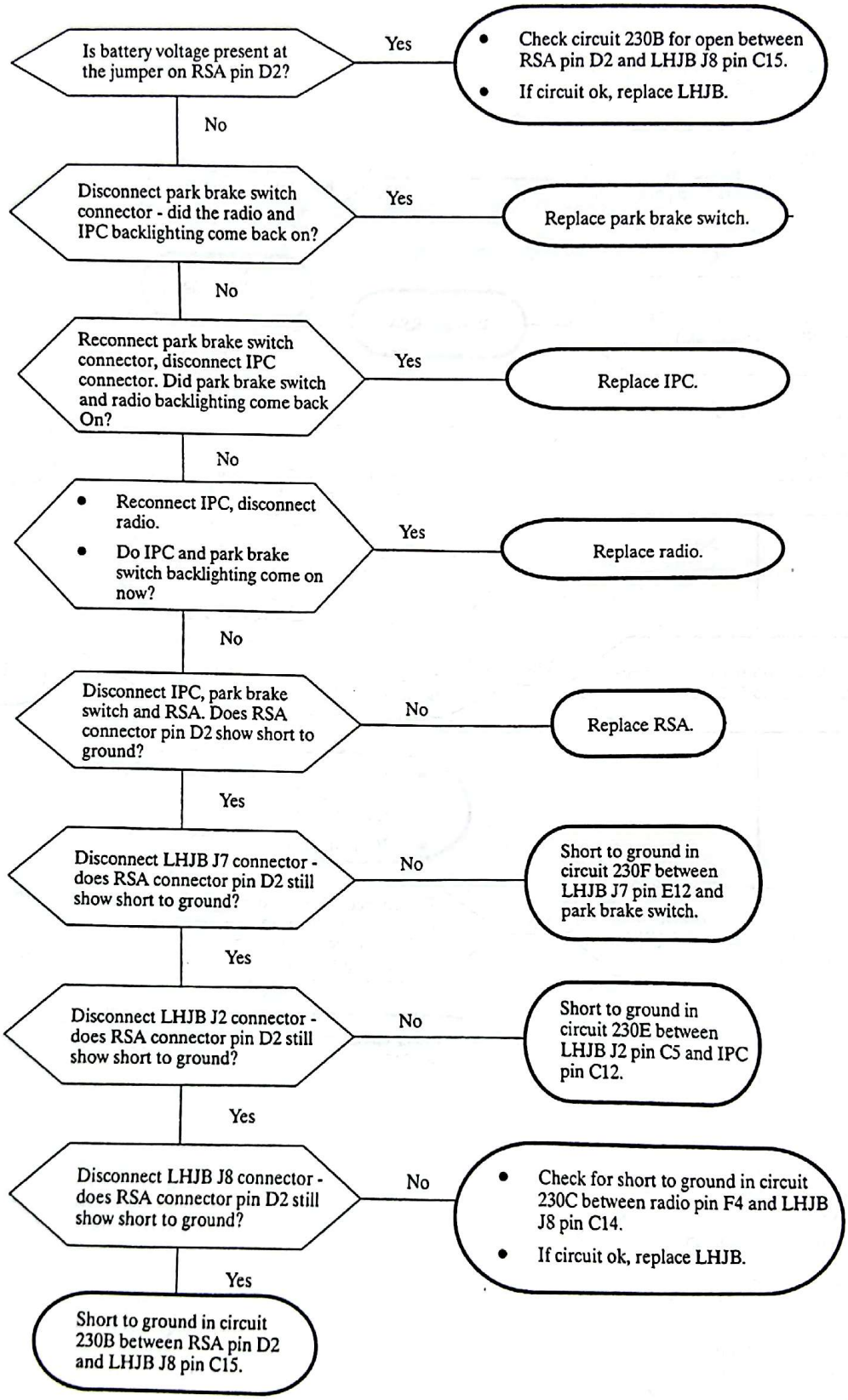

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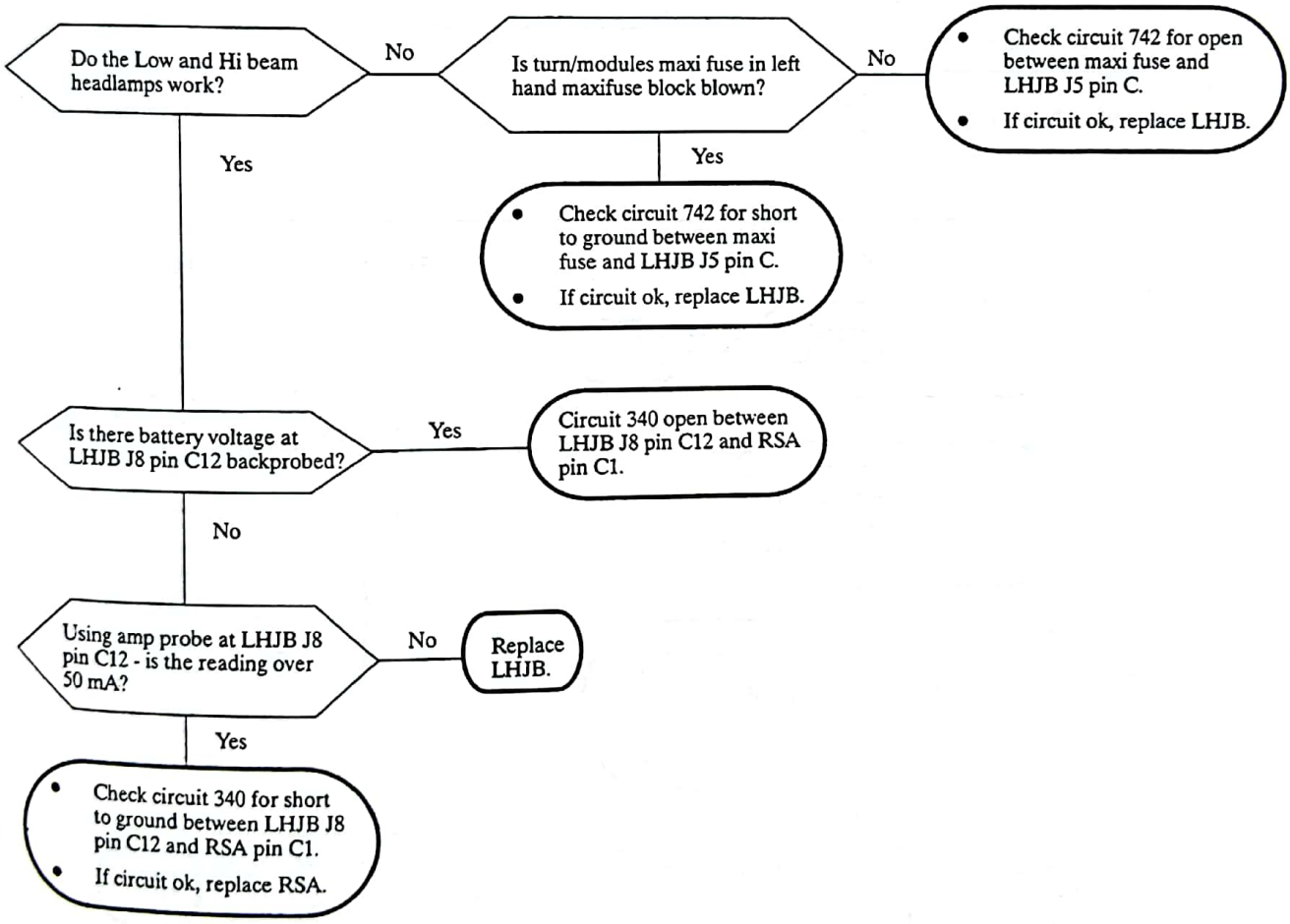
CHART 1B

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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VACUUM FLUORESCENT (VF) ON FULL, INCANDESCENTS OUT ALL THE TIME

CHART 2

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Vacuum fluorescent (VF) on full, incandescents out all the time.

Are parklamps inoperative?

Yes → Refer to Exterior Lights Chart 22 "All Park and Markers Out."

No

Which displays have this condition?

All

Using amp probe is current at LHJB J9 pin A8 over 20 mA?

Yes →
- Check circuit 301B for short to ground between radio pin F5 and LHJB J9 pin A8.
- If circuit ok, replace radio.

No

Using amp probe is current at LHJB J1 pin A12 over 20 mA?

Yes →
- Check circuit 301C for short to ground between IPC pin C4 and LHJB J1 pin A12.
- If circuit ok, replace IPC.

No

Using amp probe is current at LHJB J9 pin A9 over 20 mA?

Yes →
- Check circuit 301E for short to ground between LHJB J9 pin A9 and RSA pin C9.
- If circuit ok, replace RSA.

No

Replace LHJB.

RSA only

Backprobe power to RSA pin C9 - does backlighting dim now?

No → Replace RSA.

Yes

- Check circuit 301E for open between RSA pin C9 and LHJB J9 pin A9.
- If circuit ok, replace LHJB.

IPC only

Backprobe power to IPC pin C4 - do displays dim ok now?

No → Replace IPC.

Yes

- Check circuit 301C for open between IPC pin C4 and LHJB J1 pin A12.
- If circuit ok, replace LHJB.

Radio only

Backprobe power to radio pin F5 - does radio dim normally now?

No → Replace radio.

Yes

- Check circuit 301B for an open circuit between radio pin F5 and LHJB J9 pin A8.
- If circuit ok, replace LHJB.

NOTES

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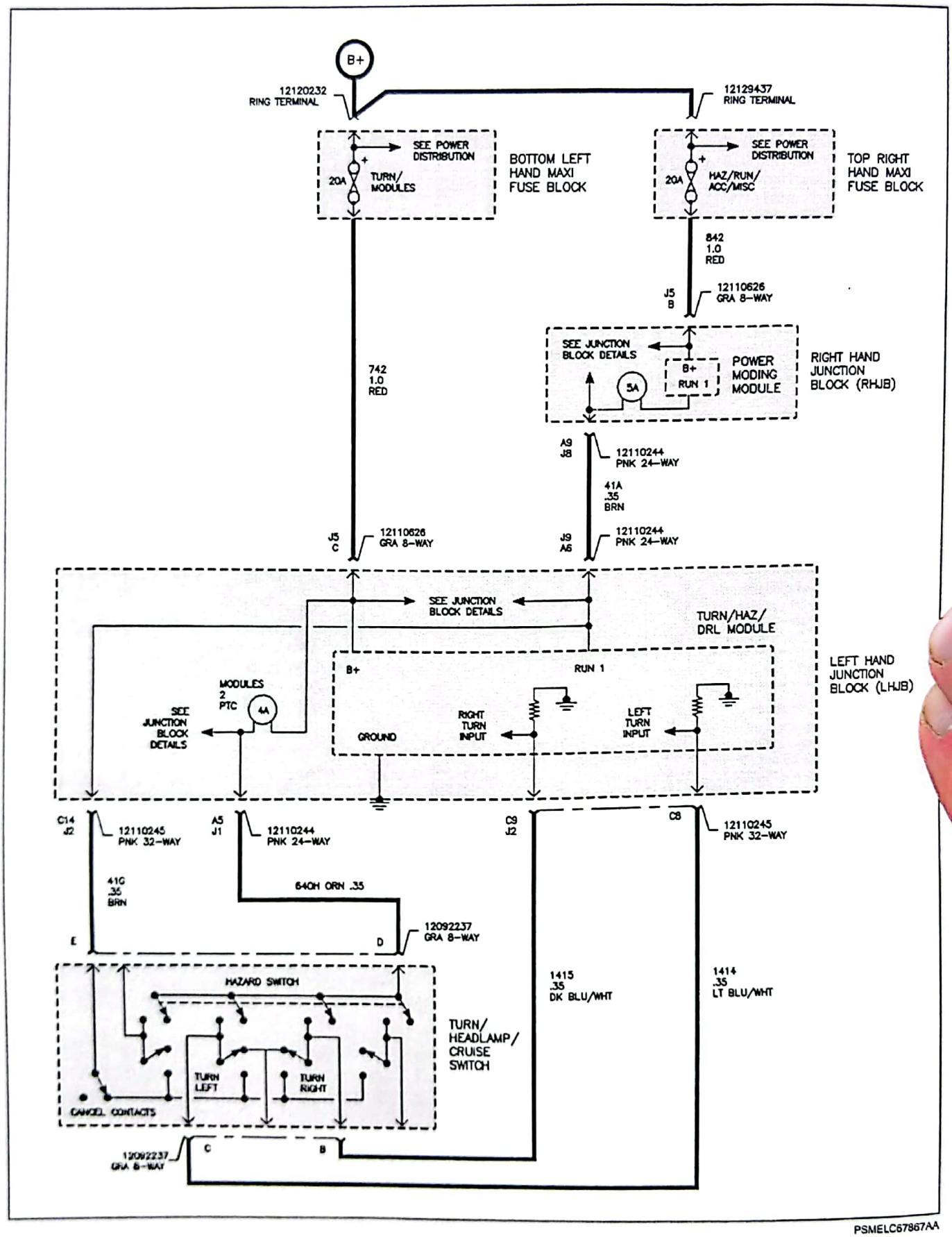
EXTERIOR LIGHTS



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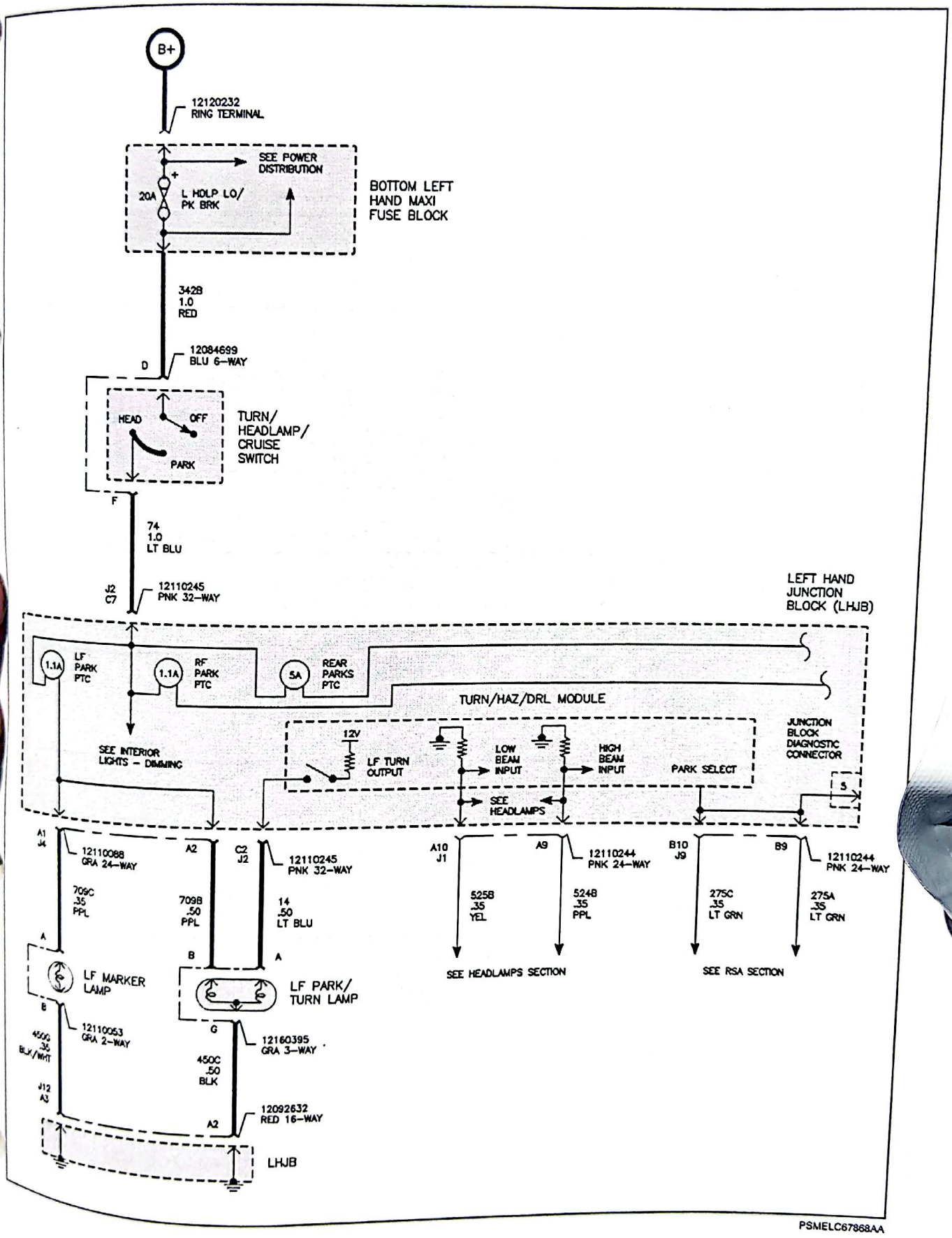
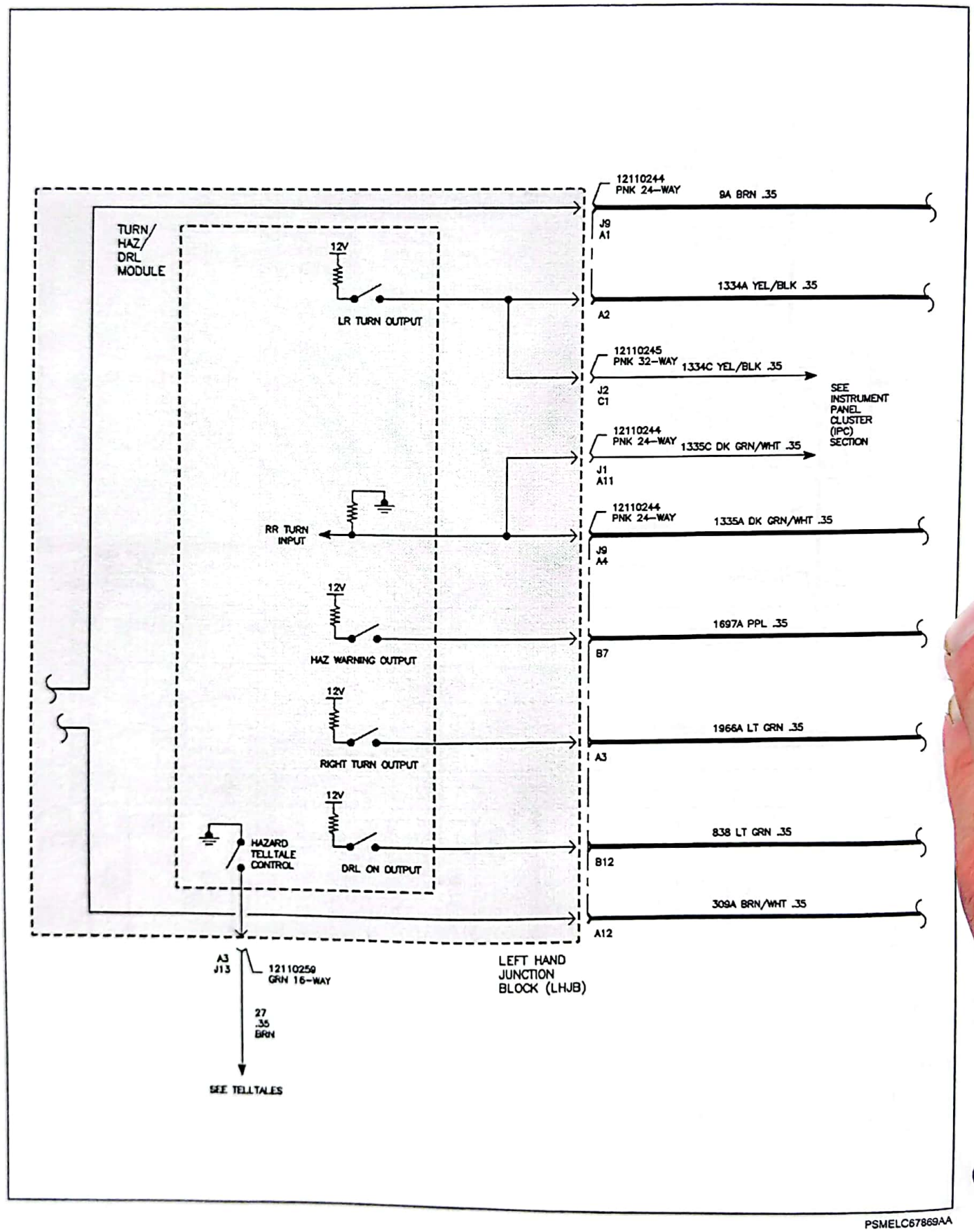

B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION
20A
L HDLP LO/ PK BRK
BOTTOM LEFT HAND MAXI FUSE BLOCK
342B
1.0
RED
D
12084699
BLU 6-WAY
HEAD
OFF
PARK
TURN/ HEADLAMP/ CRUISE SWITCH
F
74
1.0
LT BLU
J2
C7
12110245
PNK 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
1.1A
LF PARK PTC
1.1A
RF PARK PTC
5A
REAR PARKS PTC
TURN/HAZ/DRL MODULE
SEE INTERIOR LIGHTS - DIMMING
12V
LF TURN OUTPUT
LOW BEAM INPUT
HIGH BEAM INPUT
PARK SELECT
SEE HEADLAMPS
JUNCTION BLOCK DIAGNOSTIC CONNECTOR
5
A1
J4
12110088
GRA 24-WAY
709C
.35
PPL
A
LF MARKER LAMP
B
12110053
GRA 2-WAY
450D
.35
BLK/WHT
J12
A3
A2
7098
.50
PPL
B
C2
J2
12110245
PNK 32-WAY
14
.50
LT BLU
A
LF PARK/ TURN LAMP
G
12160395
GRA 3-WAY
450C
.50
BLK
A2
12092632
RED 16-WAY
LHJB
A10
J1
5258
.35
YEL
SEE HEADLAMPS SECTION
A9
12110244
PNK 24-WAY
5248
.35
PPL
B10
J9
275C
.35
LT GRN
SEE RSA SECTION
B9
12110244
PNK 24-WAY
275A
.35
LT GRN
PSMELC67868AA



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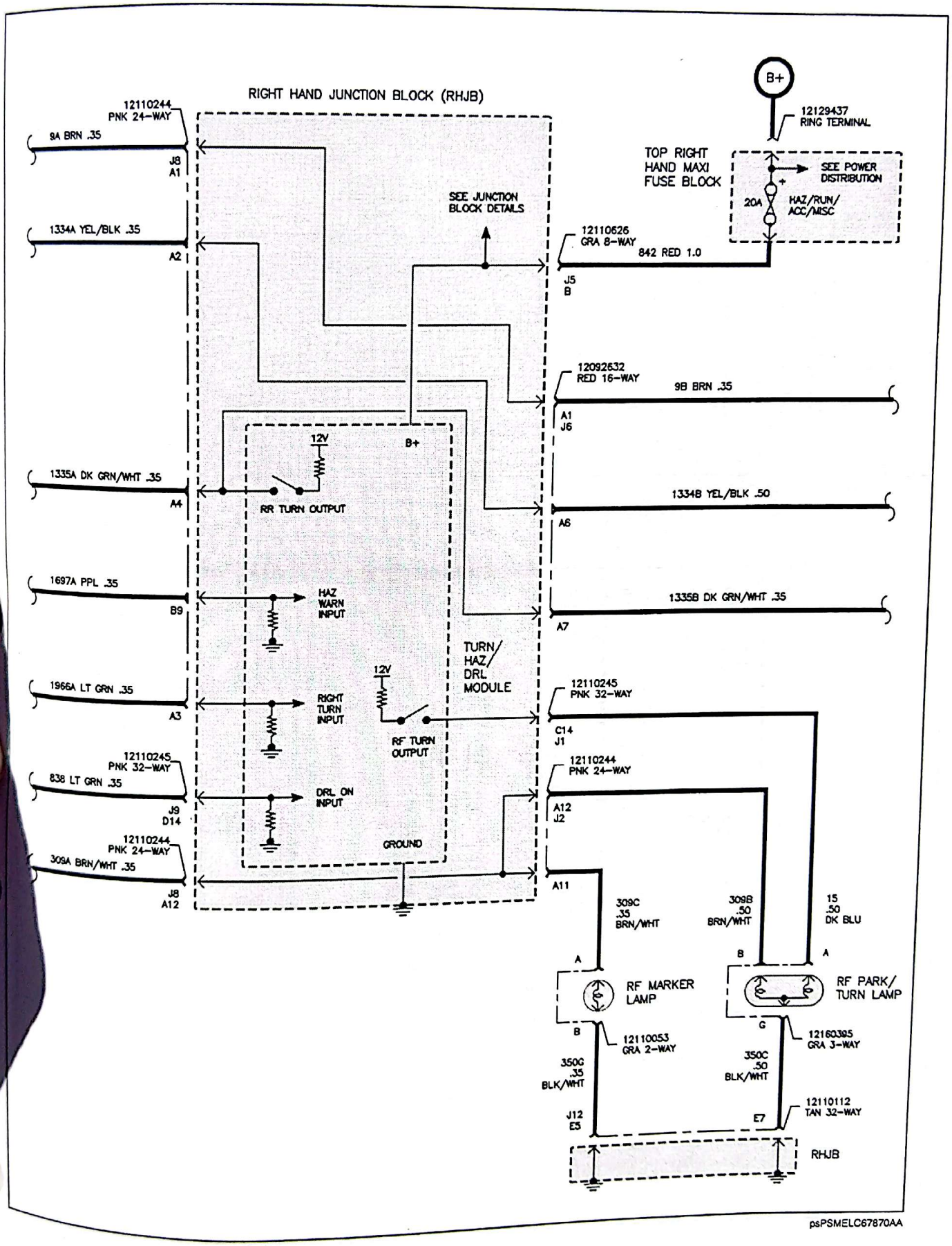
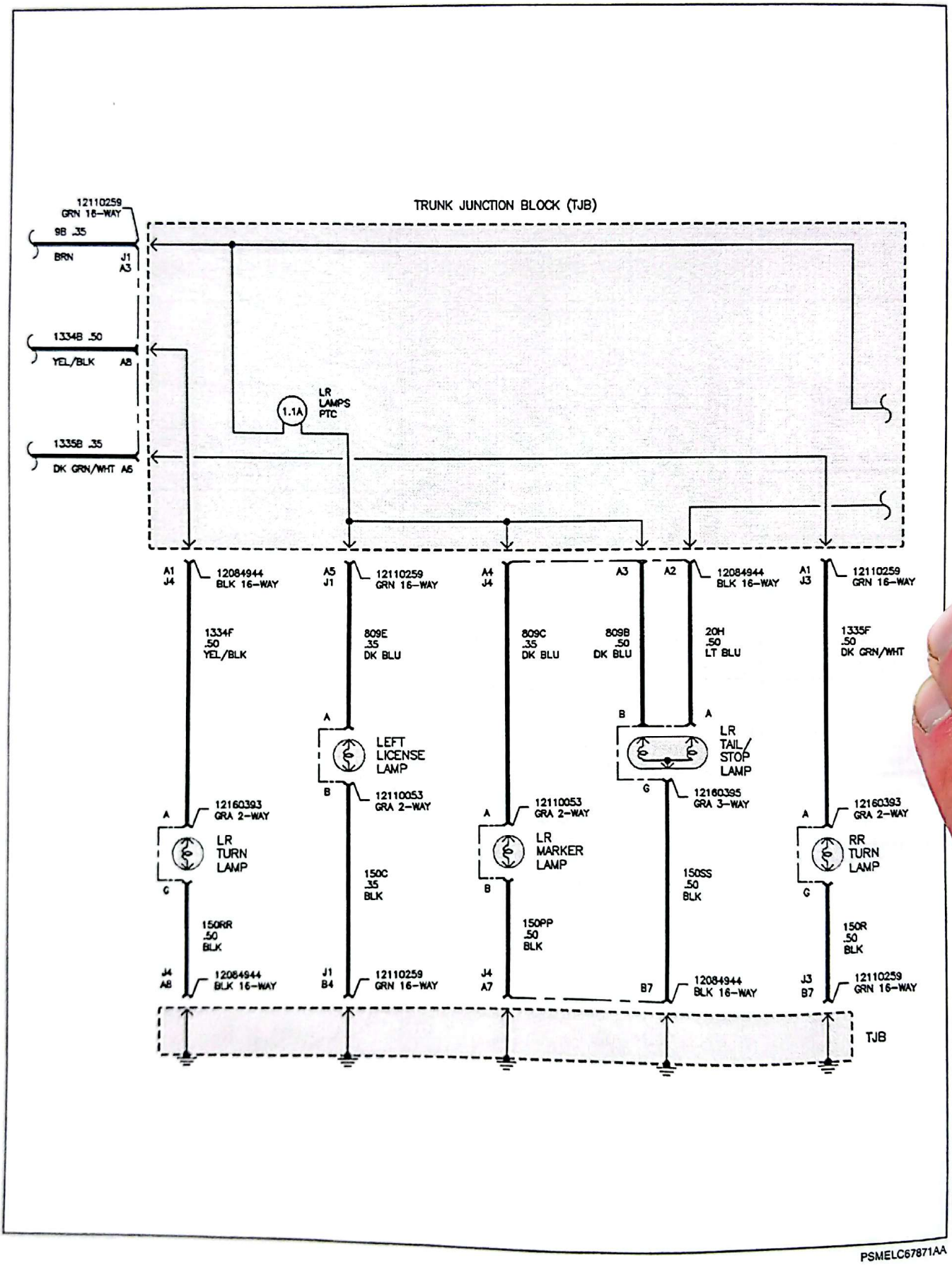

RIGHT HAND JUNCTION BLOCK (RHJB)
12110244
PNK 24-WAY
9A BRN .35
J8
A1
1334A YEL/BLK .35
A2
1335A DK GRN/WHT .35
A4
1697A PPL .35
B9
1966A LT GRN .35
A3
12110245
PNK 32-WAY
838 LT GRN .35
J9
D14
12110244
PNK 24-WAY
309A BRN/WHT .35
J8
A12
SEE JUNCTION BLOCK DETAILS
12V
B+
RR TURN OUTPUT
HAZ WARN INPUT
RIGHT TURN INPUT
DRL ON INPUT
GROUND
TURN/ HAZ/ DRL MODULE
RF TURN OUTPUT
B+
12129437
RING TERMINAL
TOP RIGHT HAND MAXI FUSE BLOCK
SEE POWER DISTRIBUTION
20A
HAZ/RUN/ ACC/MISC
12110626
GRA 8-WAY
842 RED 1.0
J5
B
12092632
RED 16-WAY
9B BRN .35
A1
J6
1334B YEL/BLK .50
A6
1335B DK GRN/WHT .35
A7
12110245
PNK 32-WAY
C14
J1
12110244
PNK 24-WAY
A12
J2
A11
309C .35 BRN/WHT
309B .50 BRN/WHT
15 .50 DK BLU
A
B
A
RF MARKER LAMP
RF PARK/ TURN LAMP
B
G
12110053
GRA 2-WAY
12160395
GRA 3-WAY
350G .35 BLK/WHT
350C .50 BLK/WHT
J12
E5
E7
12110112
TAN 32-WAY
RHJB
psPSMELC67870AA



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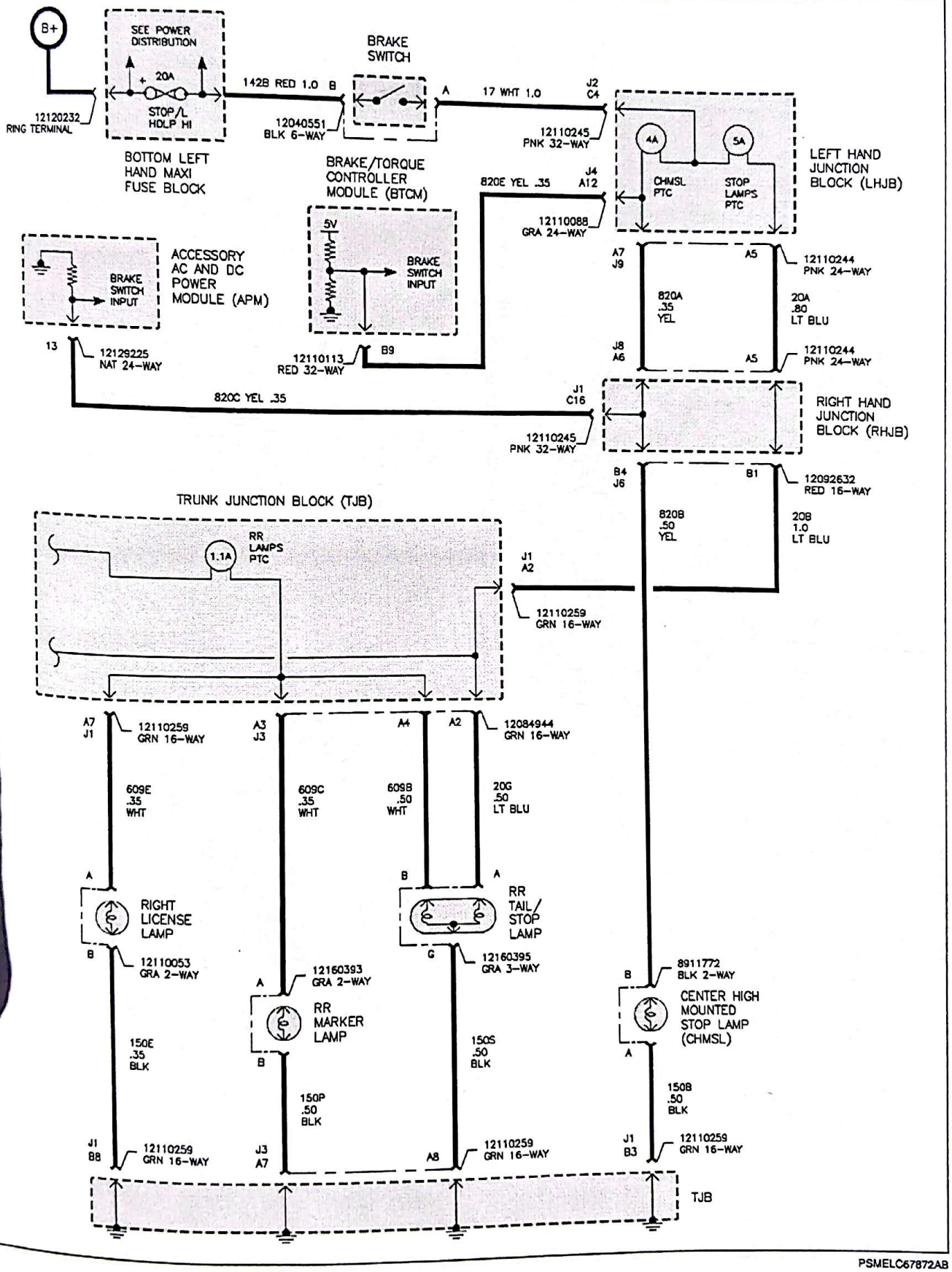

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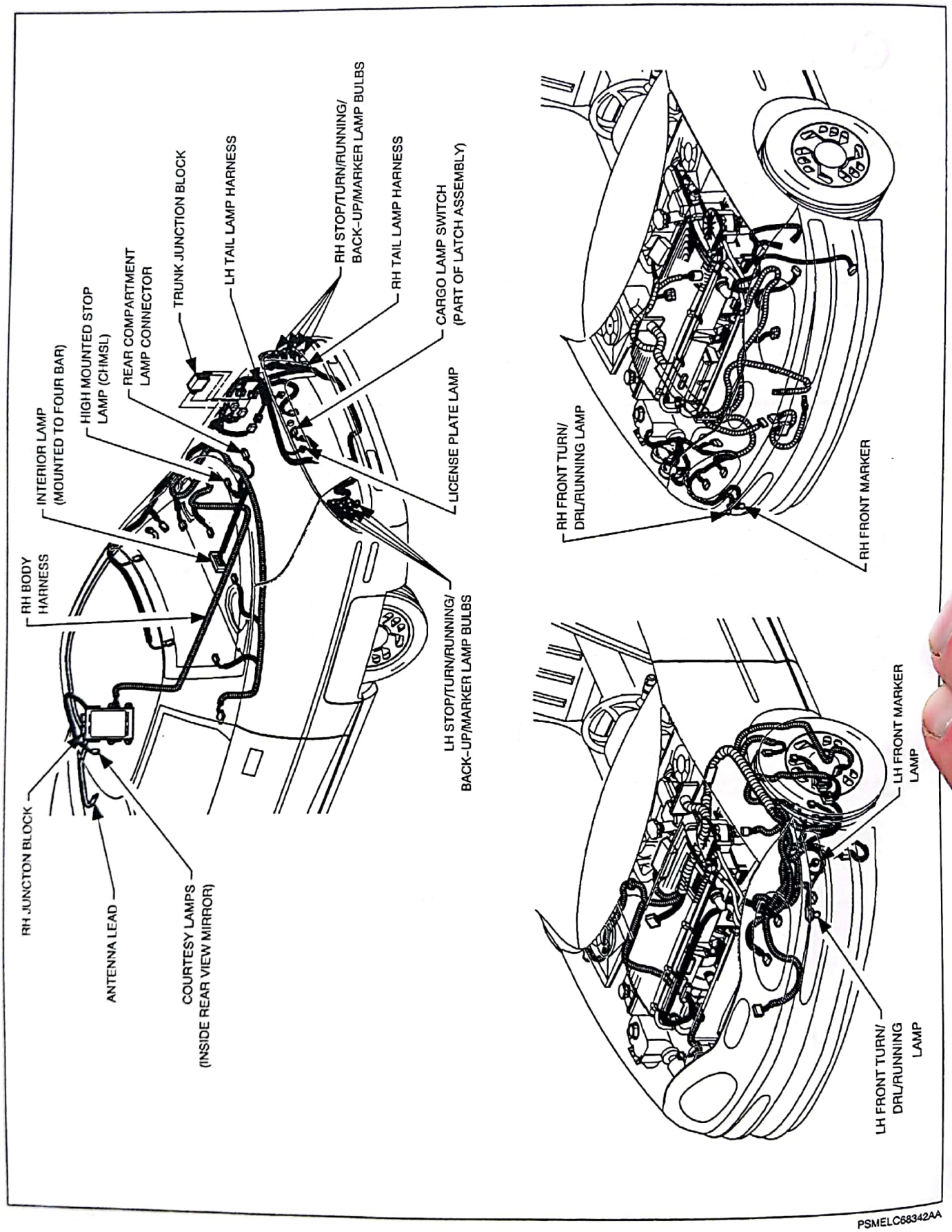
EXTERIOR LIGHTS COMPONENT LOCATION VIEWS



EXTERIOR LIGHTS

BRAKE LIGHTS

There are three brake lamps in the Electric Vehicle, the right and left side lamps and the center high mount stop lamp (CHMSL). All three are grounded directly through the trunk junction block (TJB). The power to all three originates at the maxi STOP/L HDLP HI fuse in the bottom left hand maxi fuse block. From this fuse power travels through circuit 142 to the brake switch. When the brake pedal is depressed, the switch closes and passes power through circuit 17 to the LHJB.

Inside the LHJB the power feeds two PTCs. One is a five amp PTC which feeds power to circuit 20 through the RHJB then through the TJB where it splits to feed the left and right rear stop lamps. The other PTC is four amp rated and feeds the CHMSL on circuit 820 through the RHJB. The BTCM monitors this circuit when the vehicle is not in Run mode for two reasons:

1. If the brake is applied, the BTCM wakes up and applies the brakes.
2. The brake pedal must be applied in order to release the parking brake in LOCK or ACCY modes.

The APM monitors this circuit to determine if the proper conditions are present to provide Load Shed. For more information on Load Shed refer to the Propulsion service manual.

PARK/MARKER LAMPS

The park and marker lamps are all grounded through the various junction blocks they are closest to. The left front park and marker lamps are grounded through the LHJB, the right front park and marker through the RHJB, and the rear lamps through the TJB.

The power for all the park and marker lamps originates from the L HDLP LO/PK BRK maxi fuse in the bottom left maxi fuse block. From the maxi fuse, power travels to the headlamp switch, and when the switch is turned to park lamps or headlamps, through the switch to the LHJB. Inside the LHJB the power feeds three PTCs – one for the left front park/markers, one for the right front park/markers, and one for all the rear parks, markers, and license lamps. The PTC feeding the rear lamps provides power to two PTCs in the TJB that feed the left and right side rear lamps respectively.

TURN/HAZARD LAMPS

The turn/hazard lamps are controlled by the turn/hazard modules. There are two such modules, one in the LHJB controlling the left turn signals and one in the RHJB controlling the right turn signals.

Power is provided from the LHJB over circuit 640 to the turn/hazard switch assembly. The turn hazard switch passes voltage with the turn/hazard module in the LHJB over two wires. One wire feeds voltage with left turn signal On, the other with the right turn signal On, and both are powered if hazards are selected. When the right turn signals are selected, the turn/hazard module in the LHJB provides a solid battery volt signal over circuit 1966 to the RHJB, signaling to turn On the right side turn signals.

With hazards On, the turn/hazard module in the LHJB grounds circuit 27 to turn On the hazard telltale. There is a dedicated line from the LHJB turn/hazard module to the RHJB turn/hazard module, circuit 1697, that cycles between 0 and 12 volts. This signal is used by the RHJB to control the right side hazards.

The IPC uses the left rear and right rear turn signal power feed signals to determine which turn indicators should be On and when they should be On. If either of these circuits short to ground, the IPC tone buzzes unnaturally and the front turn bulb stays On solid when turn selected.

DAYTIME RUNNING LAMPS (DRL)

The front turn lamps on the Electric Vehicle are used for daytime running lamps (DRL). DRL is turned on whenever the vehicle is in the Run mode and the PRND is not in Park. DRL is overridden if the park lamps or headlamps are turned On. If the turn signal is activated the front turn bulb on that side flashes. When the turn signal is cancelled the bulb remains On solid again. When DRL is On, the LHJB powers circuit 838 to the RHJB to command on the right front turn signal bulb.

EXTERIOR LIGHTS TROUBLE TREE INDEX

IMPORTANT: Verify the operation of all exterior lamps before choosing a troubletree; otherwise, misdiagnosis may occur. If more than one bulb is inoperative, and there is no chart that covers both together, diagnose them separately.

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The following lamp should be checked for proper operation:

- Left and right front markers, left and right rear markers.
- Left and right front park lamps, left and right rear parklamps.
- Left and right front turn signals, left and right rear turn signals.
- Left and right license lamps (in rear), center high mounted stop lamp (CHMSL).
- Left and right rear stop lamps.

SINGLE LIGHTS OUT TROUBLETREES

- Chart 1 – Left Front Marker Out Only
- Chart 2 – Left Front Turn Signal Out Only
- Chart 3 – Left Front Park Lamp Out Only
- Chart 4 – Right Front Marker Out Only
- Chart 5 – Right Front Turn Signal Out Only
- Chart 6 – Right Front Park Lamp Out Only
- Chart 7 – Left Rear Marker Out Only
- Chart 8 – Right Rear Marker Out Only
- Chart 9 – Left Rear Park Lamp Out Only
- Chart 10 – Right Rear Park Lamp Out Only
- Chart 11 – Left Rear License Lamp Out Only
- Chart 12 – Right Rear License Lamp Out Only
- Chart 13 – Left Rear Stop Lamp Out Only
- Chart 14 – Right Rear Stop Lamp Out Only
- Chart 15 – Center High Mounted Stop Lamp (CHMSL) Inoperative (Left Rear and Right Rear Stop Lamps OK)
- Chart 16 – Left Rear Turn Signal Out Only
- Chart 17 – Right Rear Turn Signal Out Only

MULTIPLE LIGHTS OUT TROUBLETREES

- Chart 18 – Left Front Park and Turn Lamps Out Only
- Chart 19 – Right Front Park and Turn Lamps Out Only
- Chart 20 – Left Front Park and Marker Out
- Chart 21 – Right Front Park and Marker Out
- Chart 22 – All Park and Markers Out
- Chart 23 – Left Side Turn Signals Out With Left Turn Signals and/or Hazards Selected
- Chart 24 – Right Side Turn Signals Out With Right Turn Signals and/or Hazards Selected
- Chart 25 – Both Side Turn Signals Out
- Chart 26 – Left Rear Park and Stop Lamps Out Only
- Chart 27 – Right Rear Park and Stop Lamps Out Only
- Chart 28 – Left Rear and Right Rear Stop Lamps Out (Center High Mounted Stop Lamp (CHMSL) Working)
- Chart 29 – All Stop Lamps Inoperative (Left Rear, Right Rear and Center High Mounted Stop Lamp [CHMSL])
- Chart 30 – Left Rear Park, Marker and License Lamps Out
- Chart 31 – Right Rear Park, Marker and License Lamps Out
- Chart 32 – All Rear Park Lamps Inoperative (Fronts are OK)
- Chart 33 – Hazards Inoperative (Turn Signals Both Work OK)
- Chart 34 – Daytime Running Lights (DRL) On in Park

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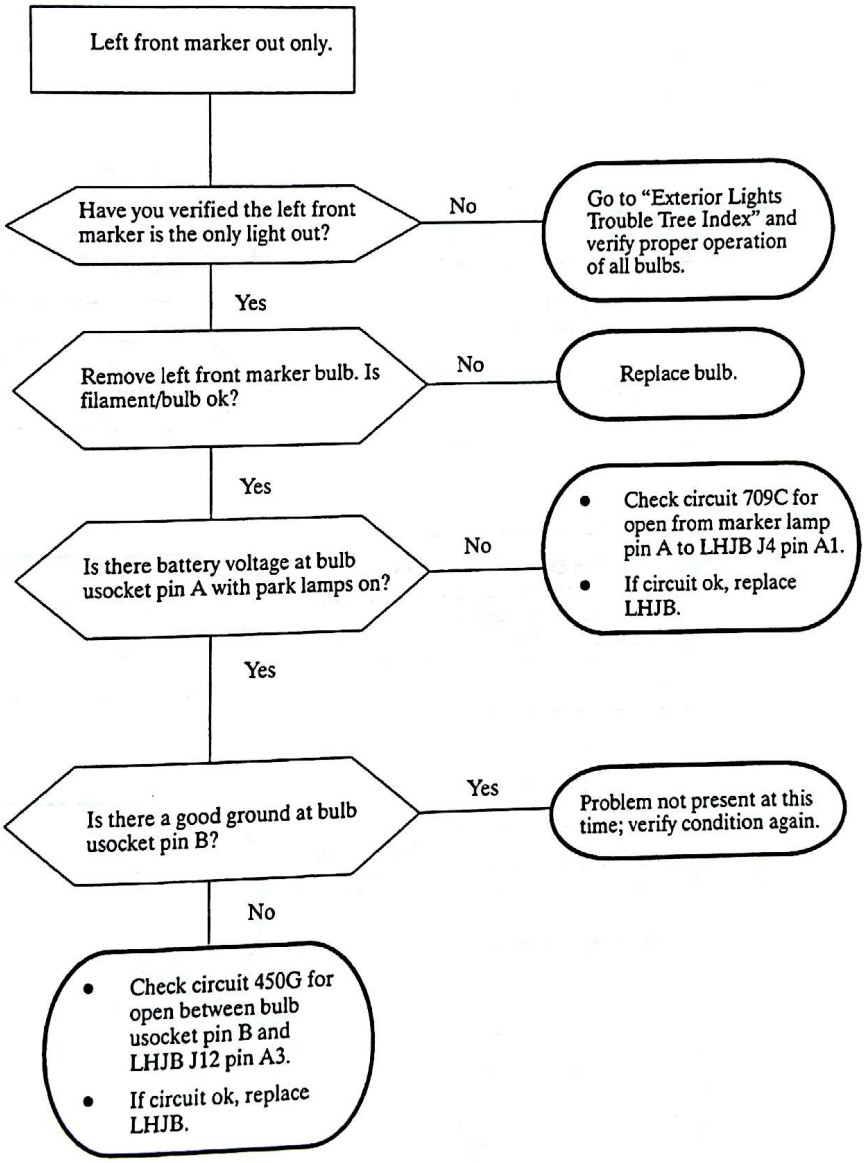
LEFT FRONT MARKER OUT ONLY

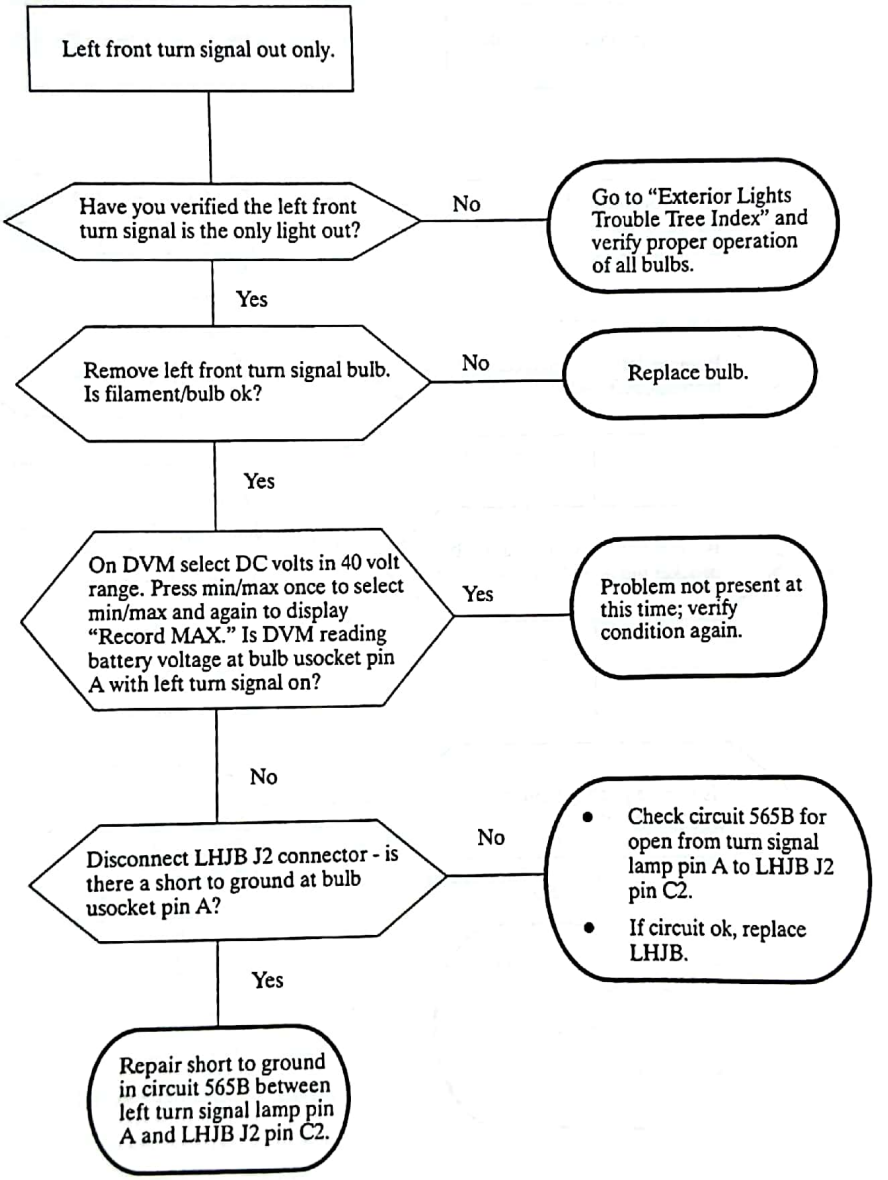
CHART 1



CamScanner

LEFT FRONT TURN SIGNAL OUT ONLY

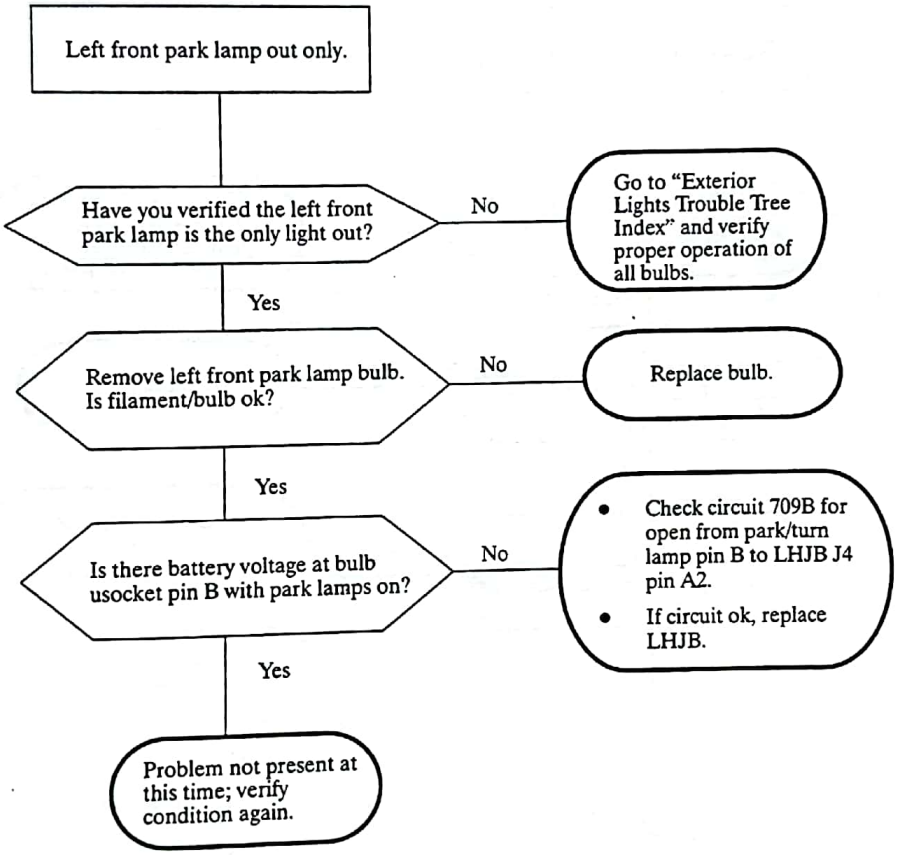
CHART 2



CamScanner

LEFT FRONT PARK LAMP OUT ONLY

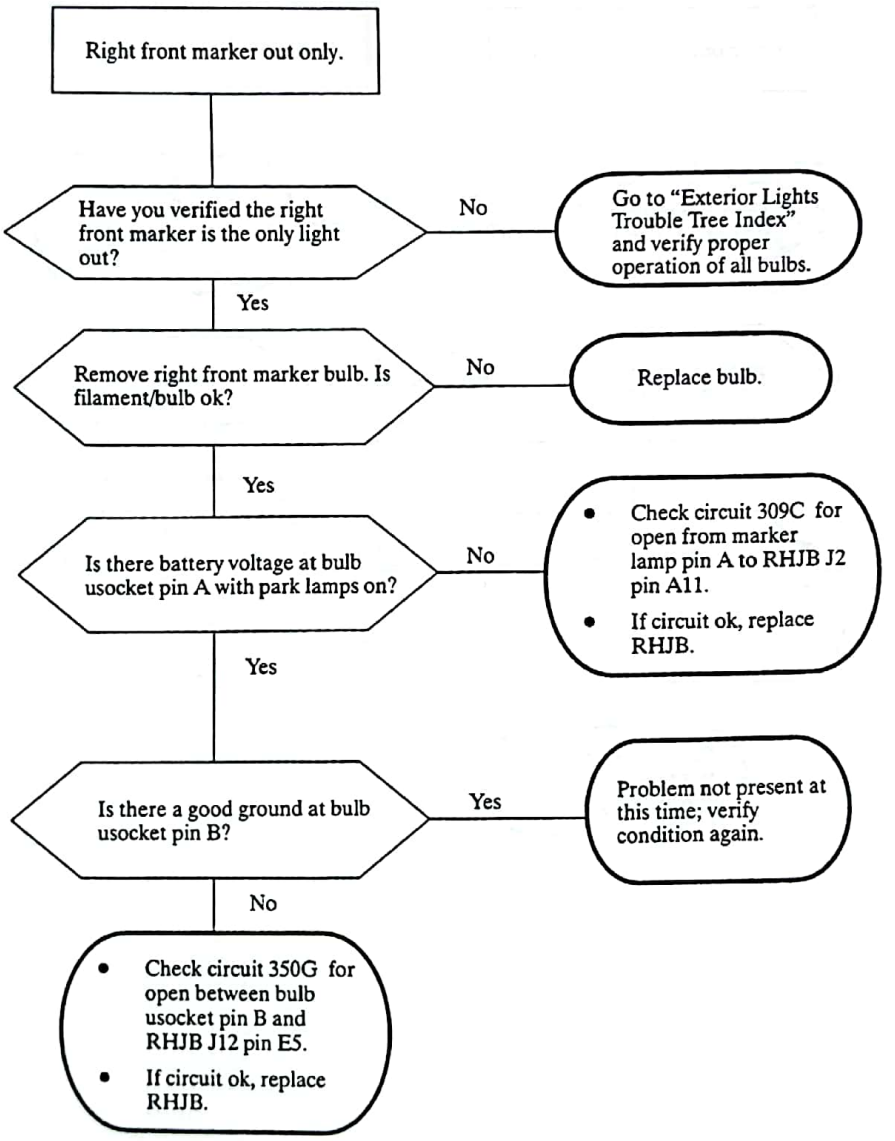
CHART 3



CamScanner

RIGHT FRONT MARKER OUT ONLY

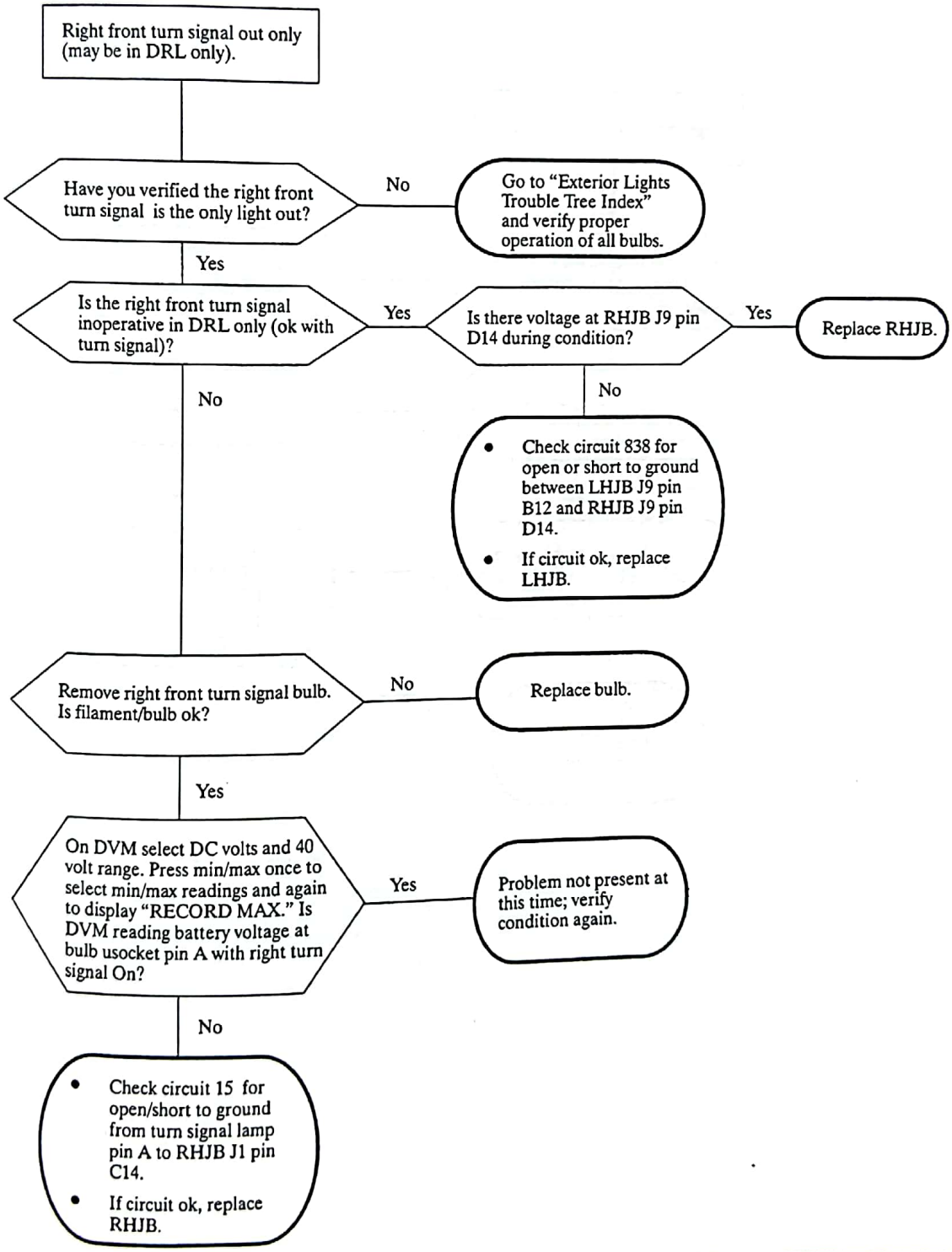
CHART 4



CamScanner

RIGHT FRONT TURN SIGNAL OUT ONLY

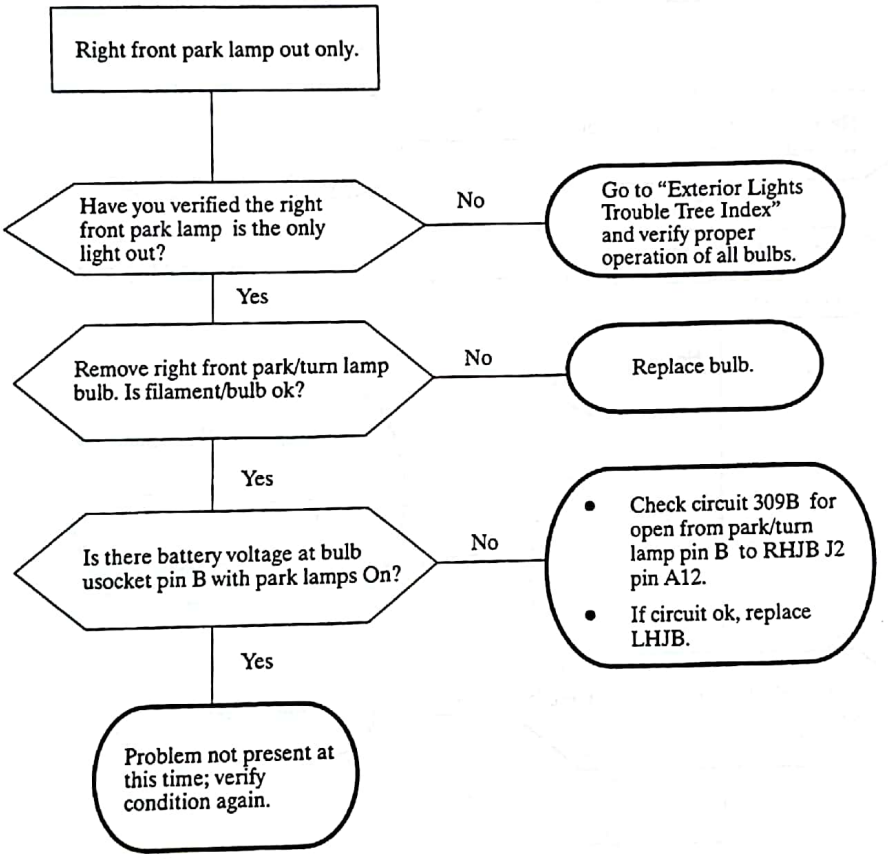
CHART 5



CamScanner

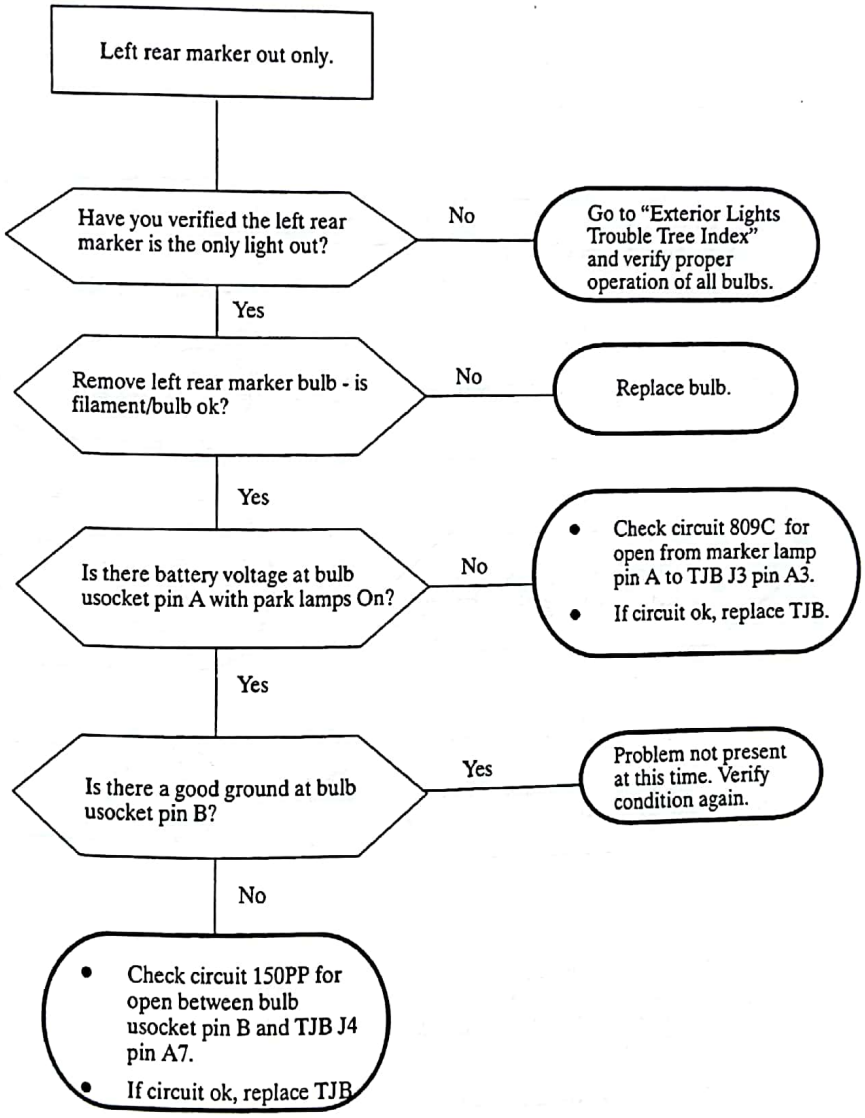
RIGHT FRONT PARK LAMP OUT ONLY

CHART 6



LEFT REAR MARKER OUT ONLY

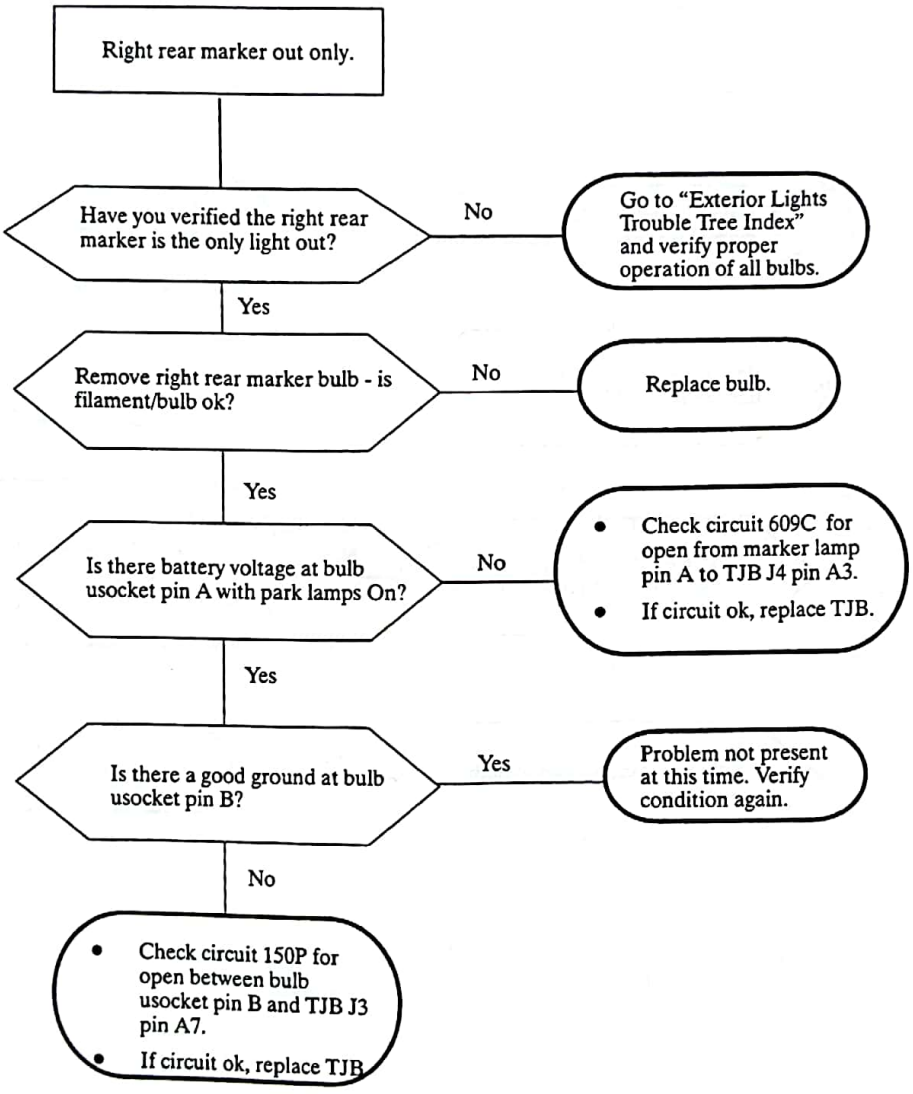
CHART 7



CamScanner

RIGHT REAR MARKER OUT ONLY

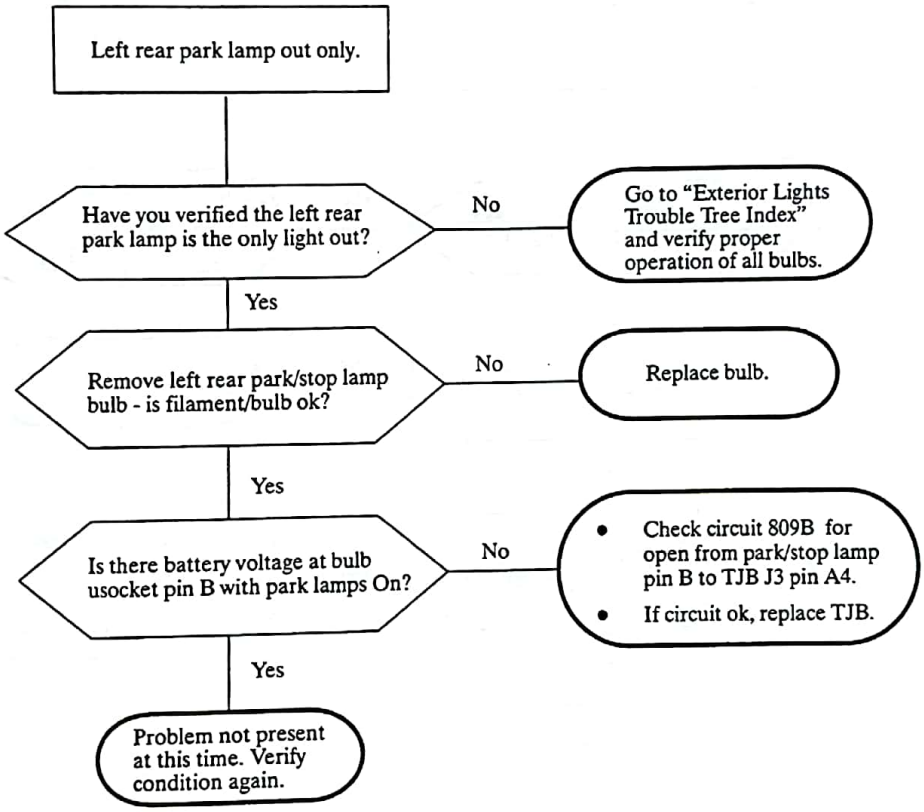
CHART 8



CamScanner

LEFT REAR PARK LAMP OUT ONLY

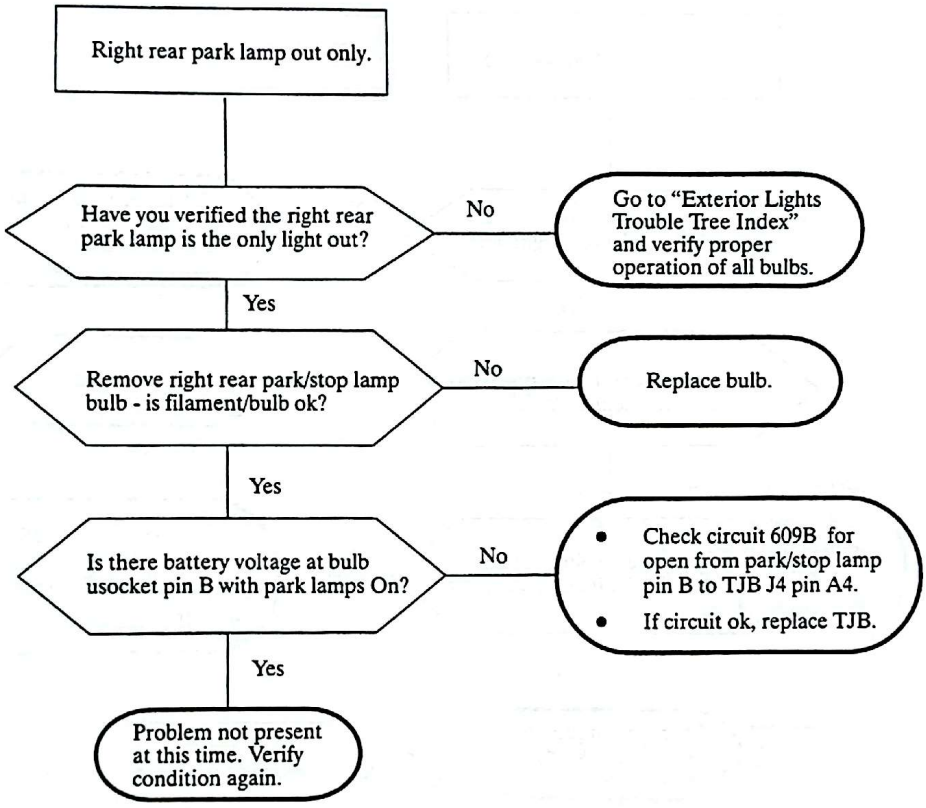
CHART 9



CamScanner

RIGHT REAR PARK LAMP OUT ONLY

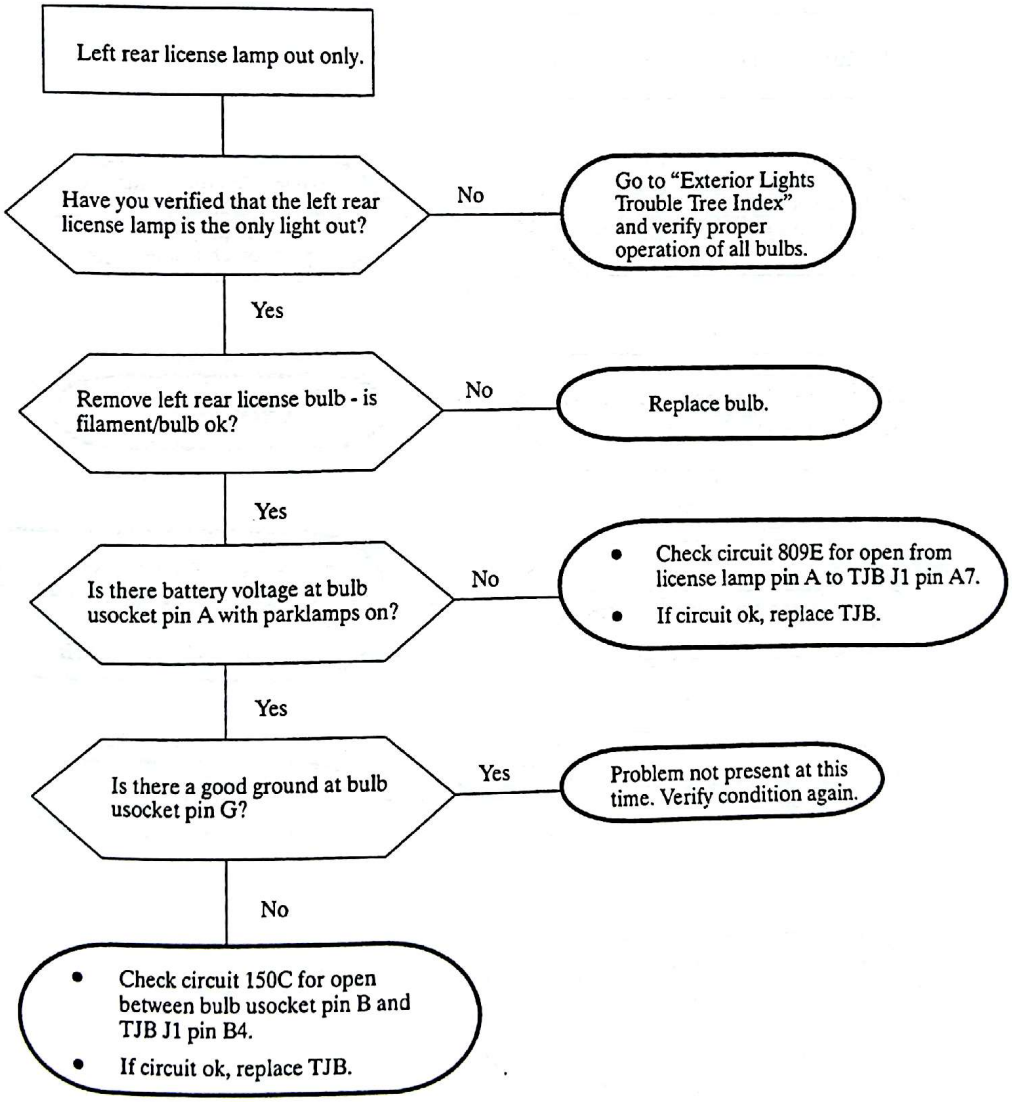
CHART 10



CamScanner

LEFT REAR LICENSE LAMP OUT ONLY

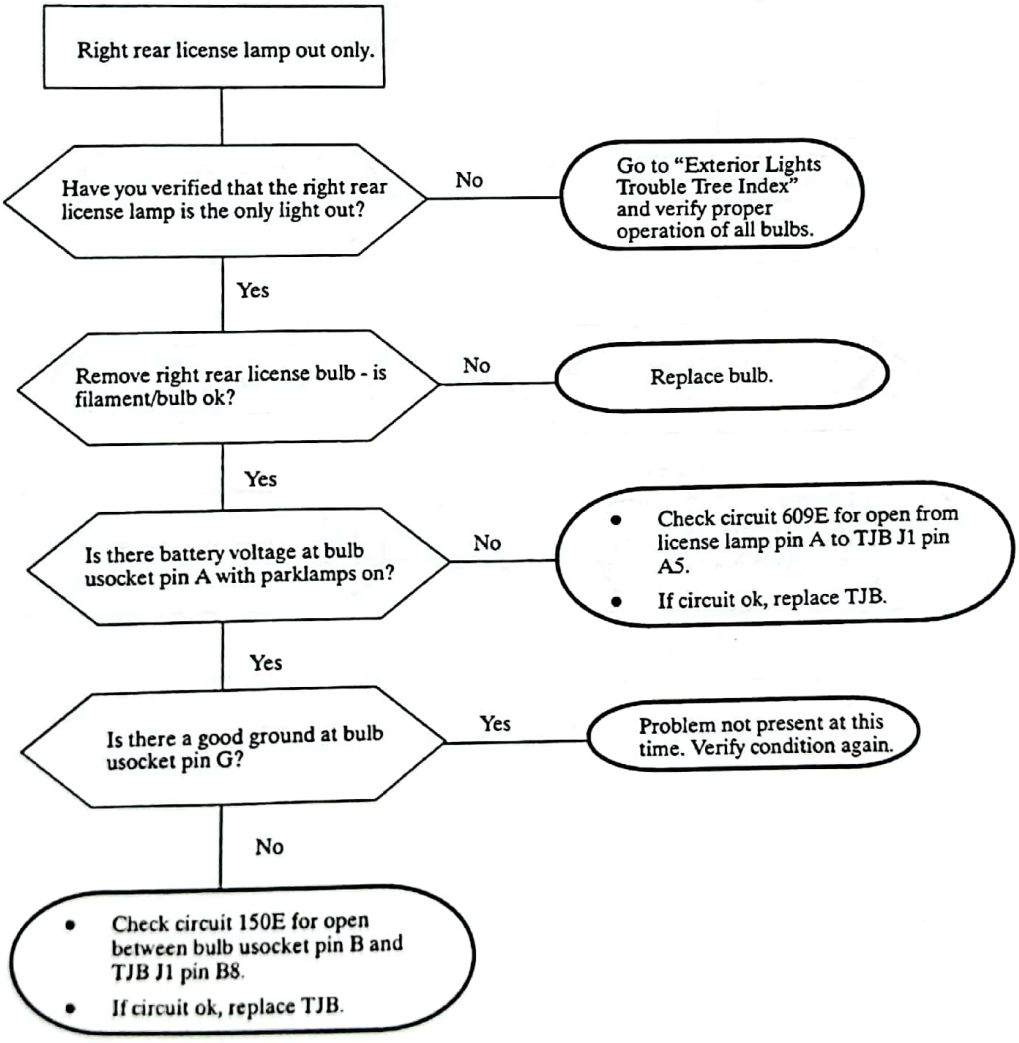
CHART 11



CamScanner

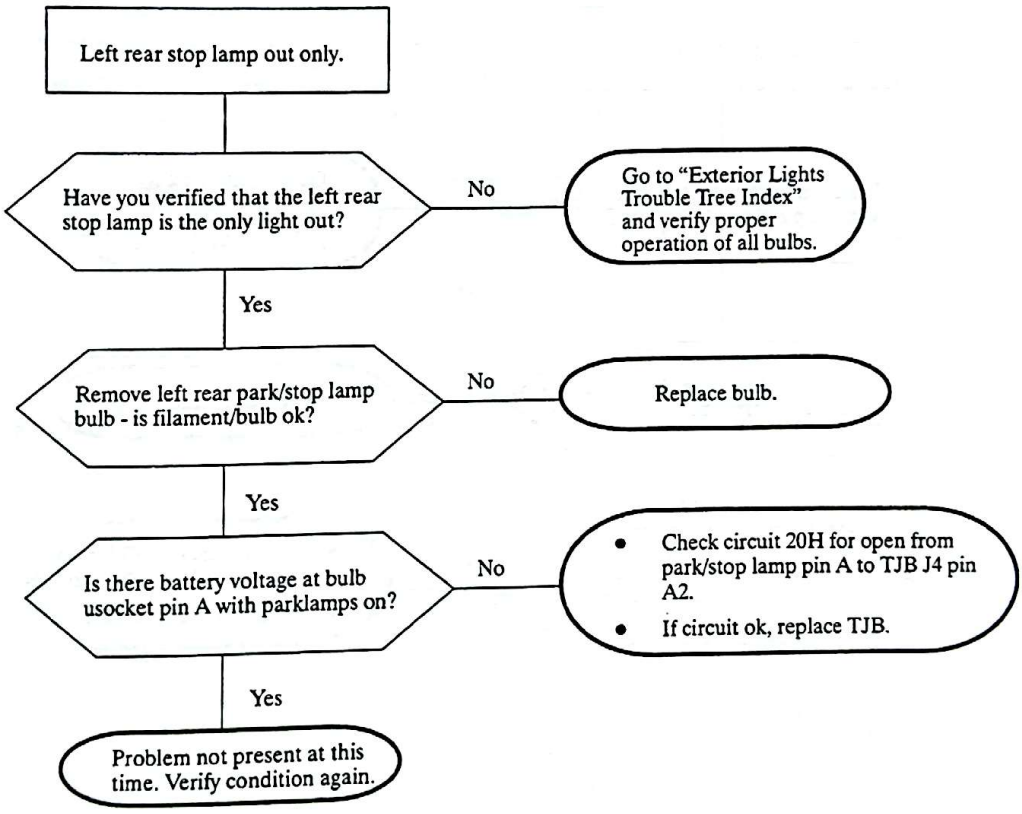
RIGHT REAR LICENSE LAMP OUT ONLY

CHART 12



LEFT REAR STOP LAMP OUT ONLY

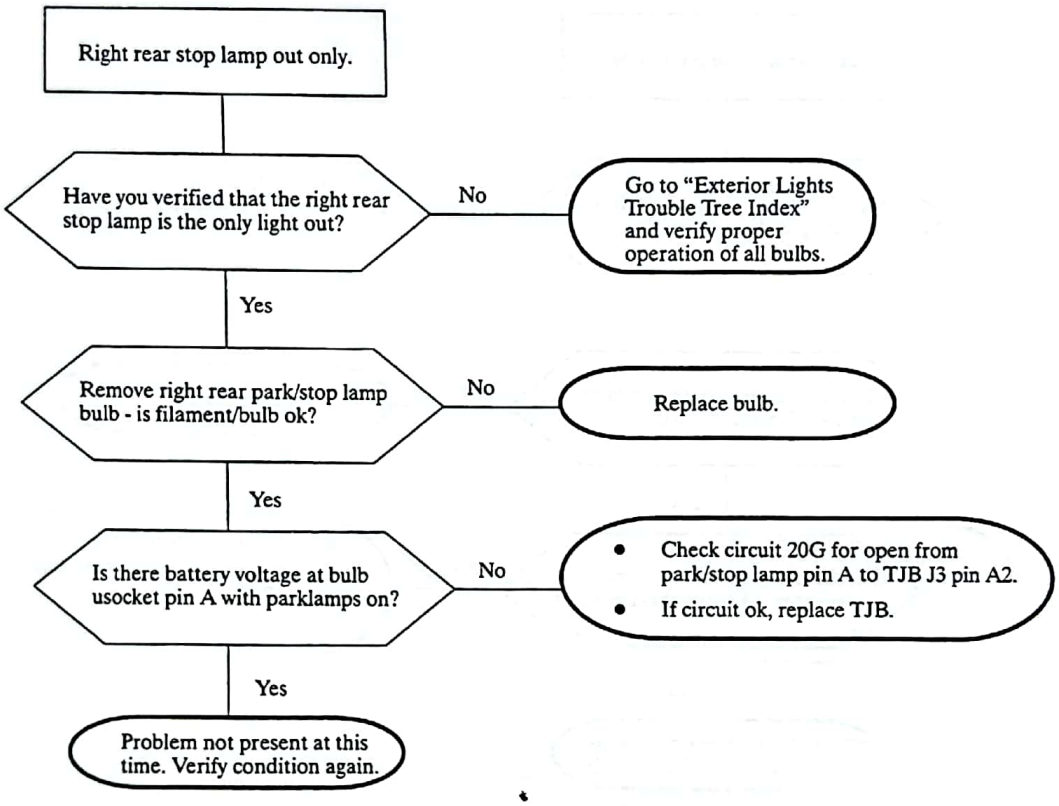
CHART 13



CamScanner

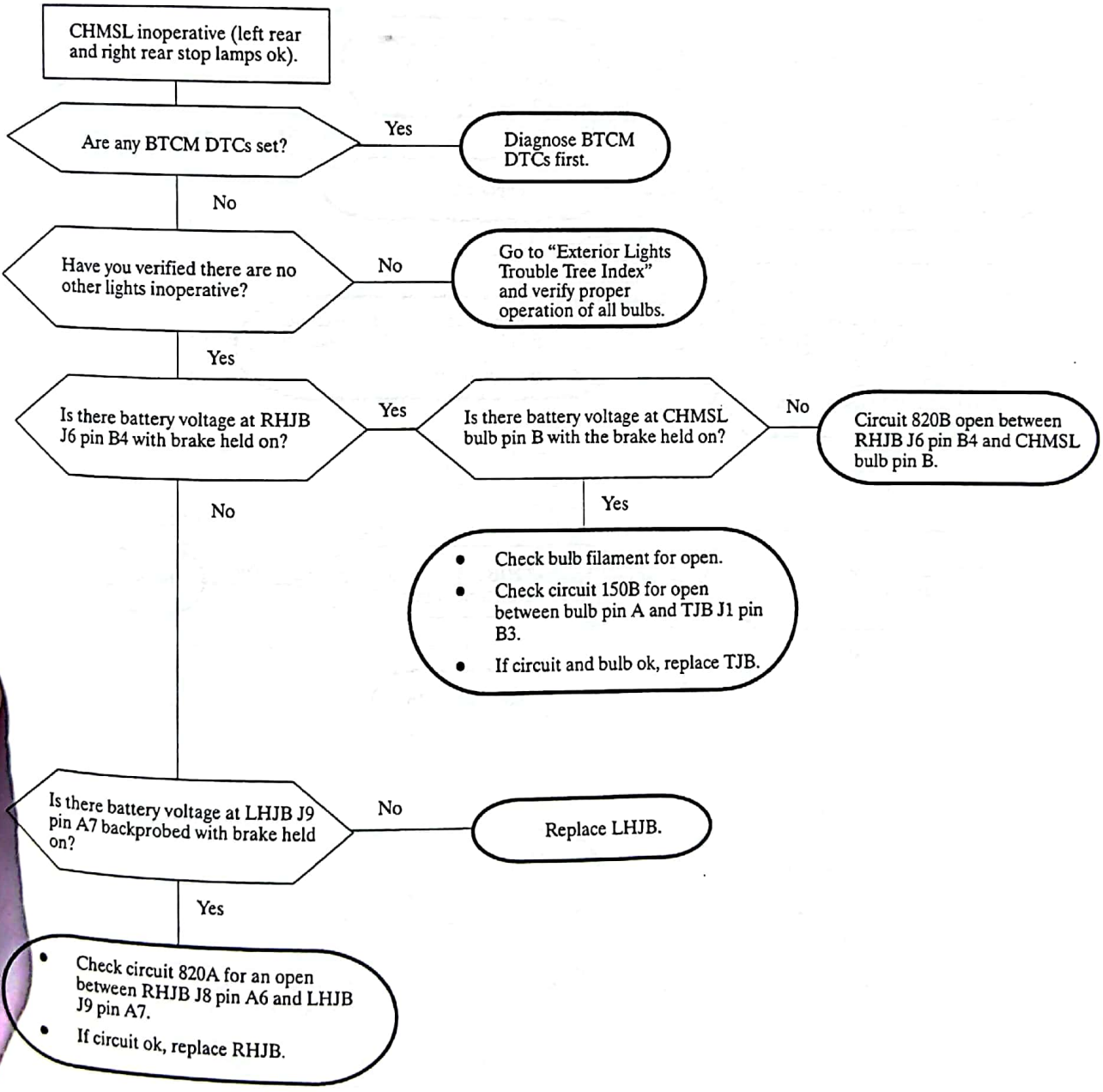
RIGHT REAR STOP LAMP OUT ONLY

CHART 14



CENTER HIGH MOUNTED STOP LAMP (CHMSL) INOPERATIVE (LEFT REAR AND RIGHT REAR STOP LAMPS OK)

CHART 15

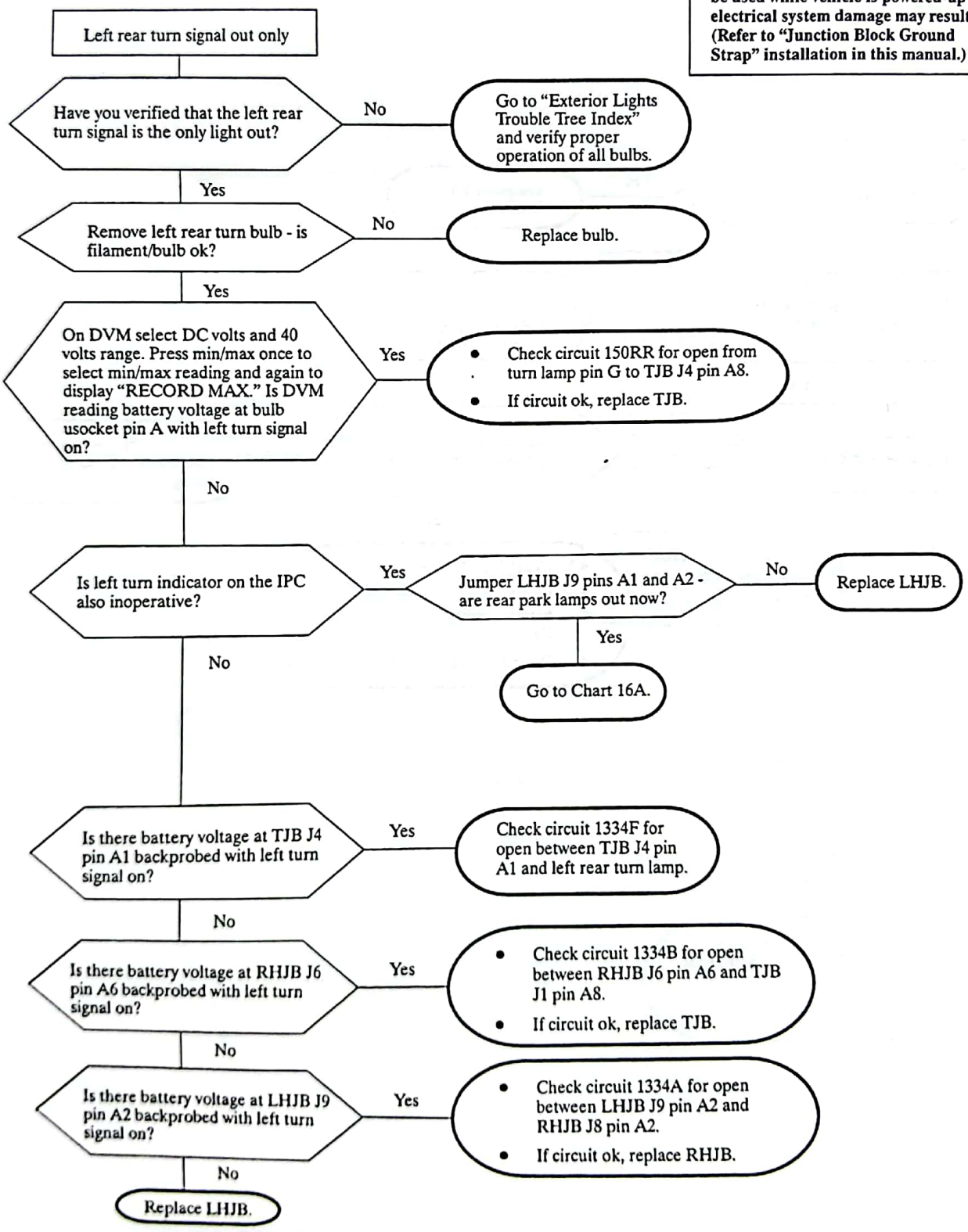


CamScanner

LEFT REAR TURN SIGNAL OUT ONLY

CHART 16

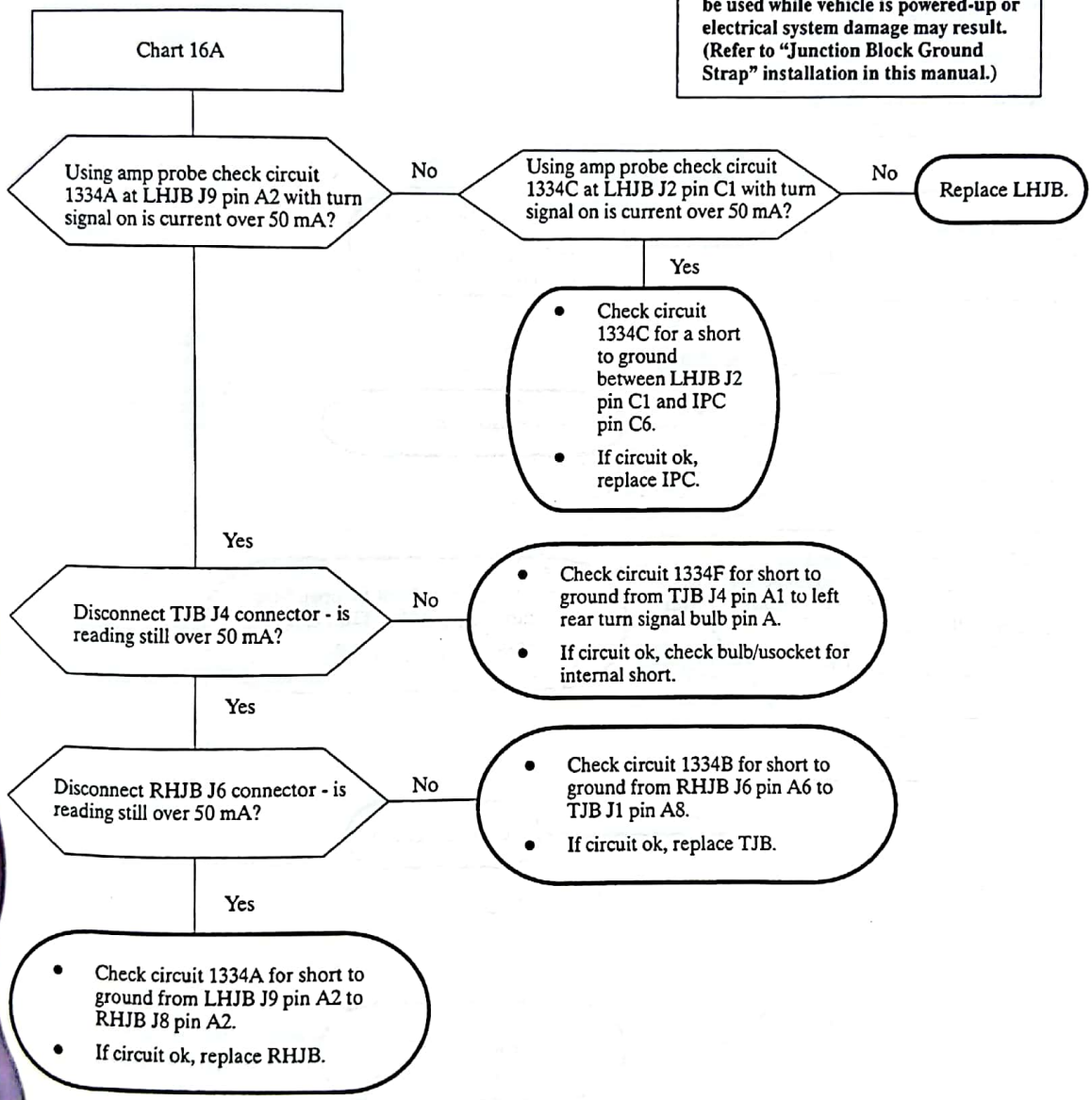
NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



CamScanner

CHART 16A

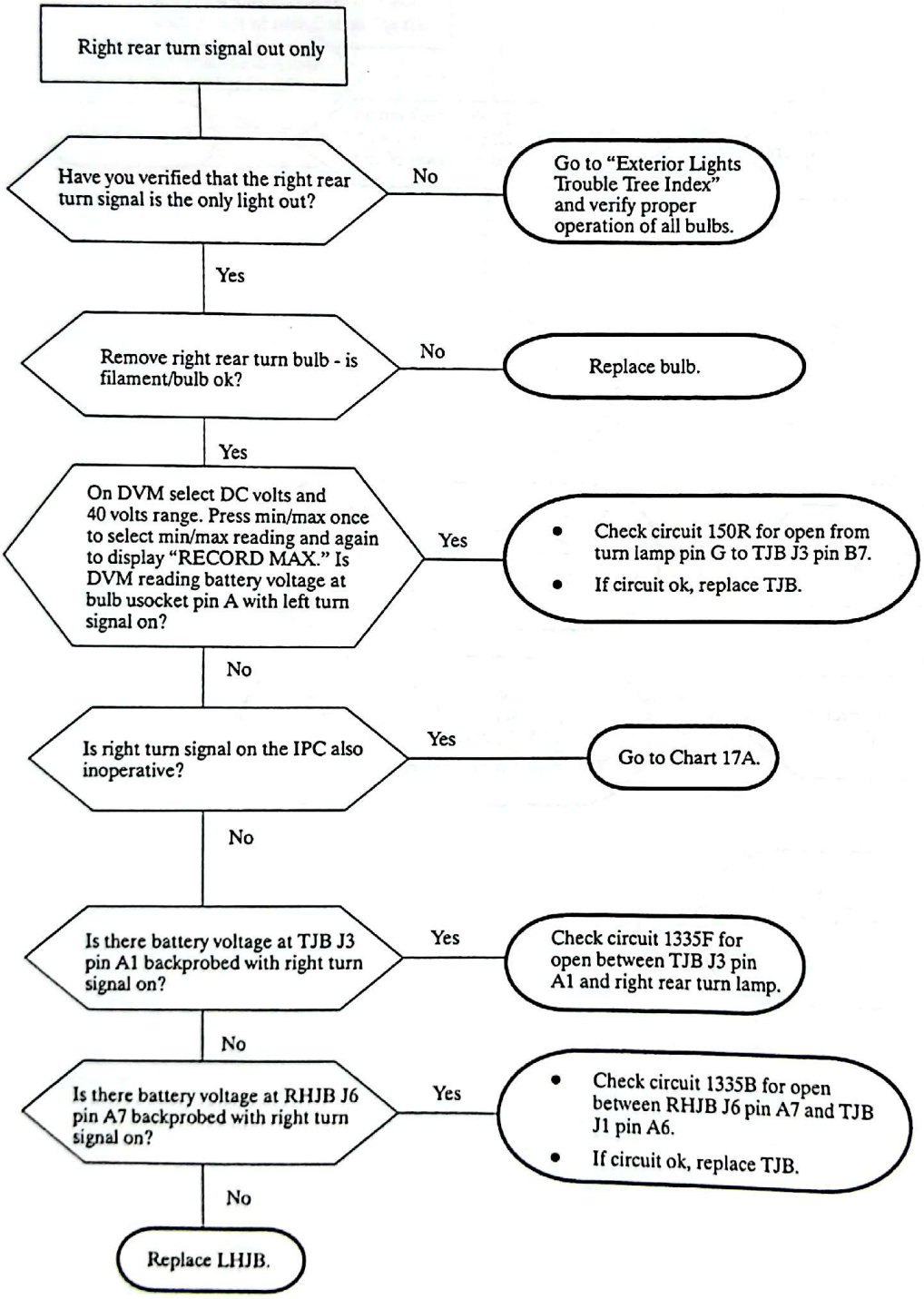
NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



CamScanner

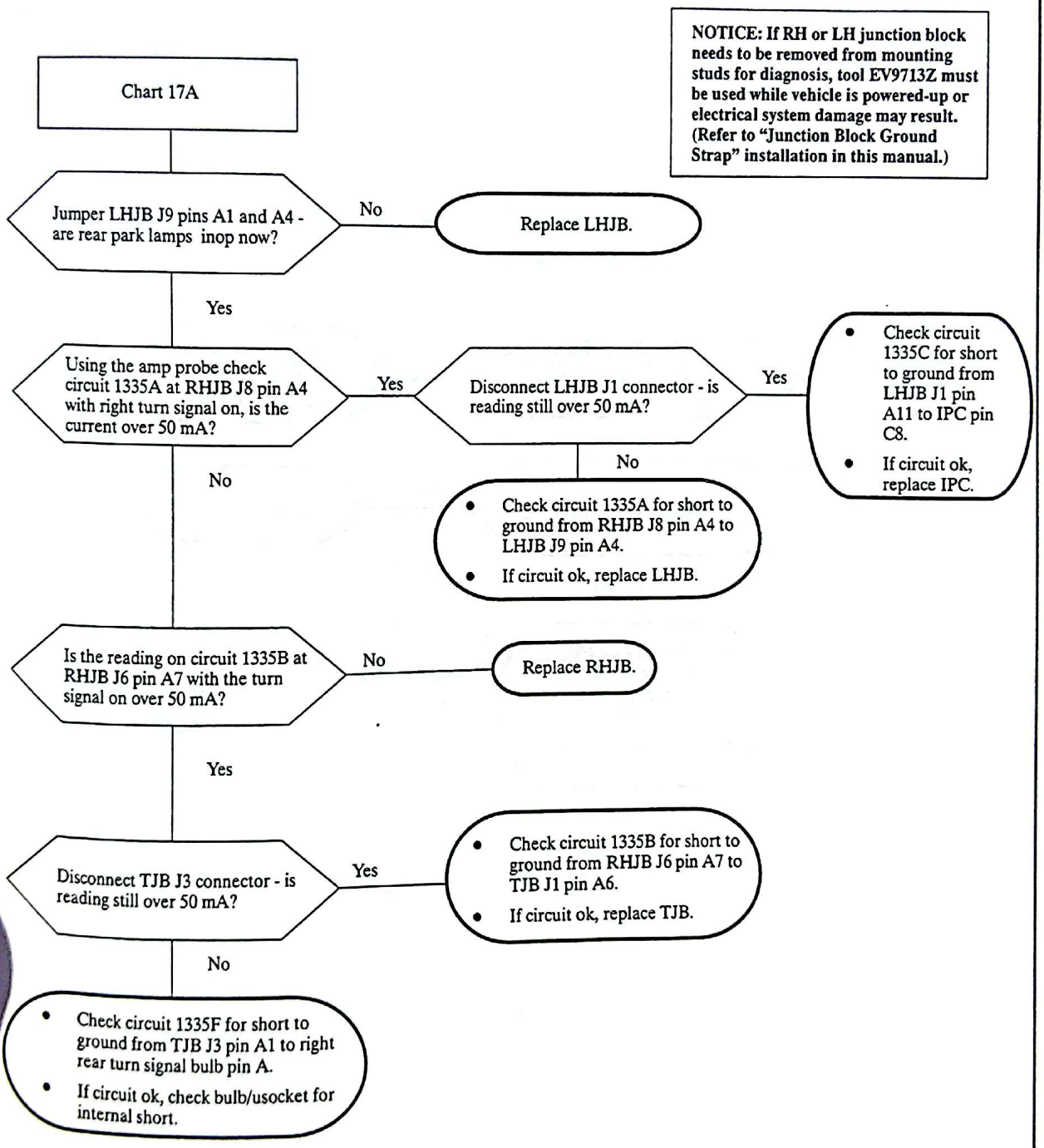
RIGHT REAR TURN SIGNAL OUT ONLY

CHART 17



CamScanner

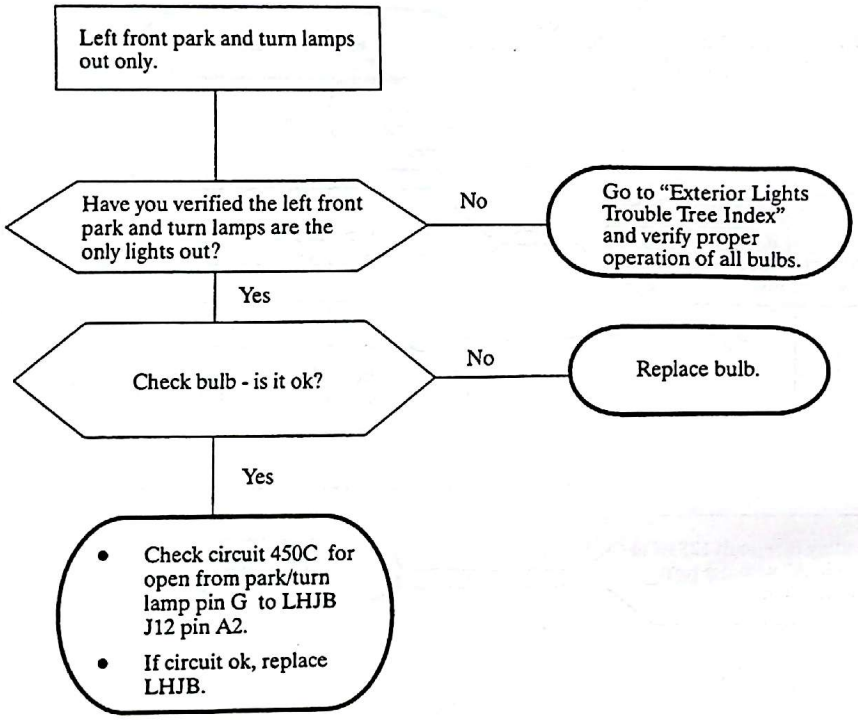
CHART 17A



CamScanner

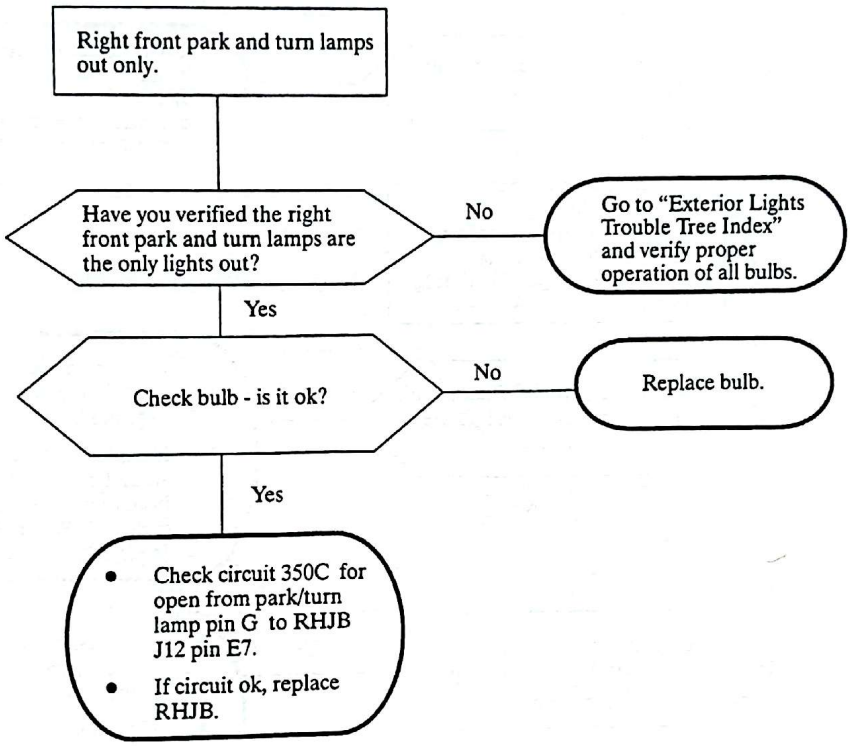
LEFT FRONT PARK AND TURN LAMPS OUT ONLY

CHART 18



RIGHT FRONT PARK AND TURN LAMPS OUT ONLY

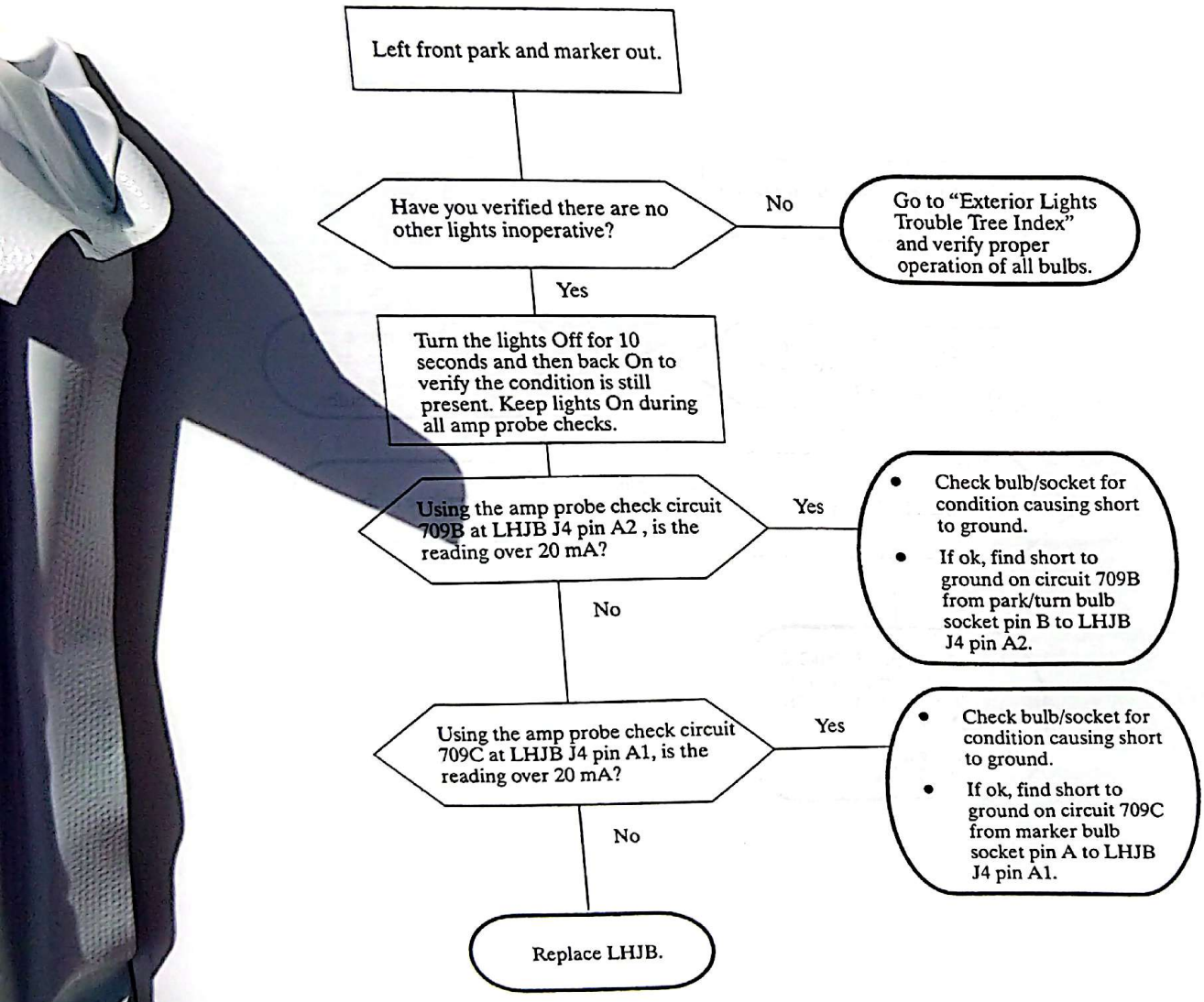
CHART 19



CamScanner

LEFT FRONT PARK AND MARKER OUT

CHART 20

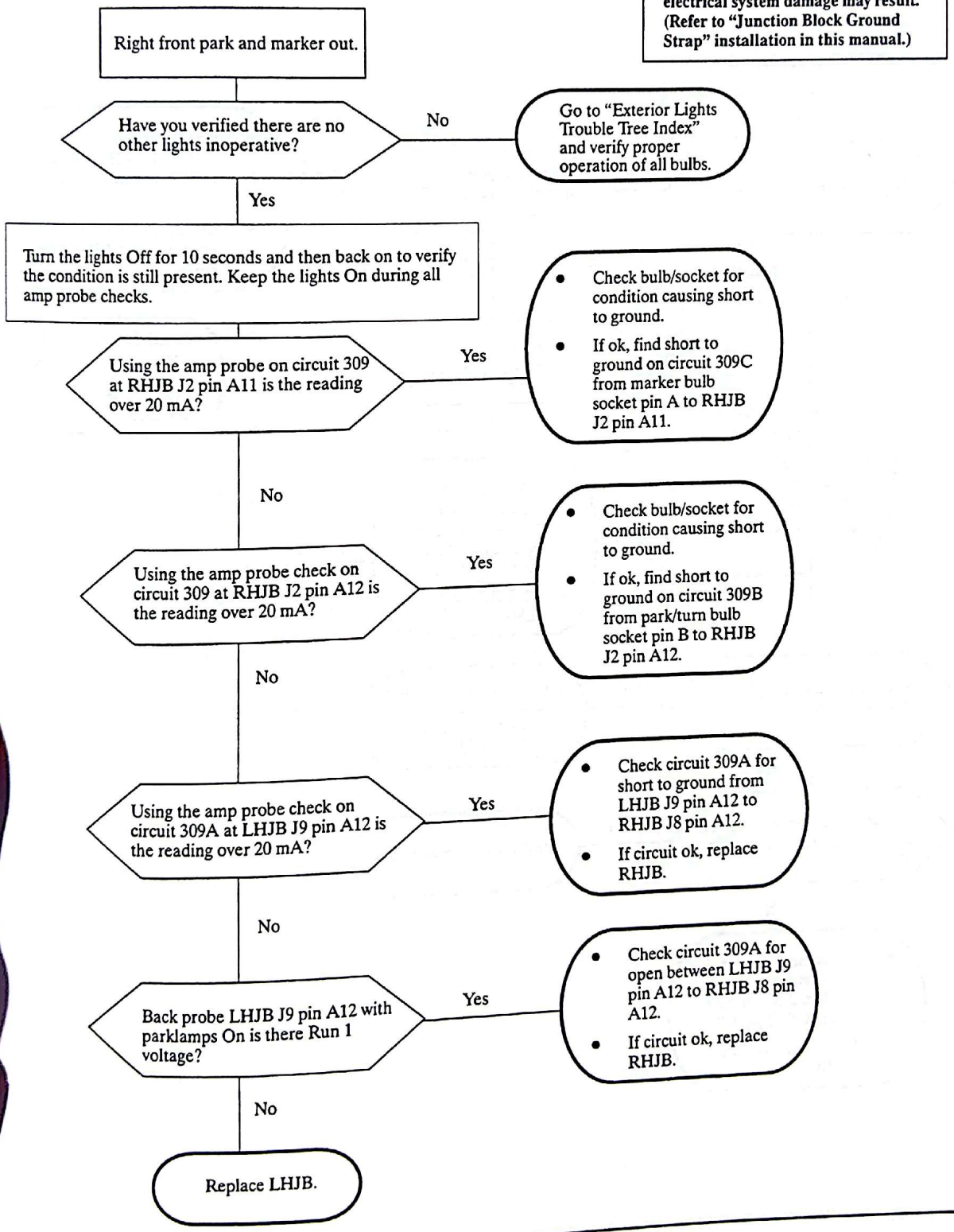


CamScanner

RIGHT FRONT PARK AND MARKER OUT

CHART 21

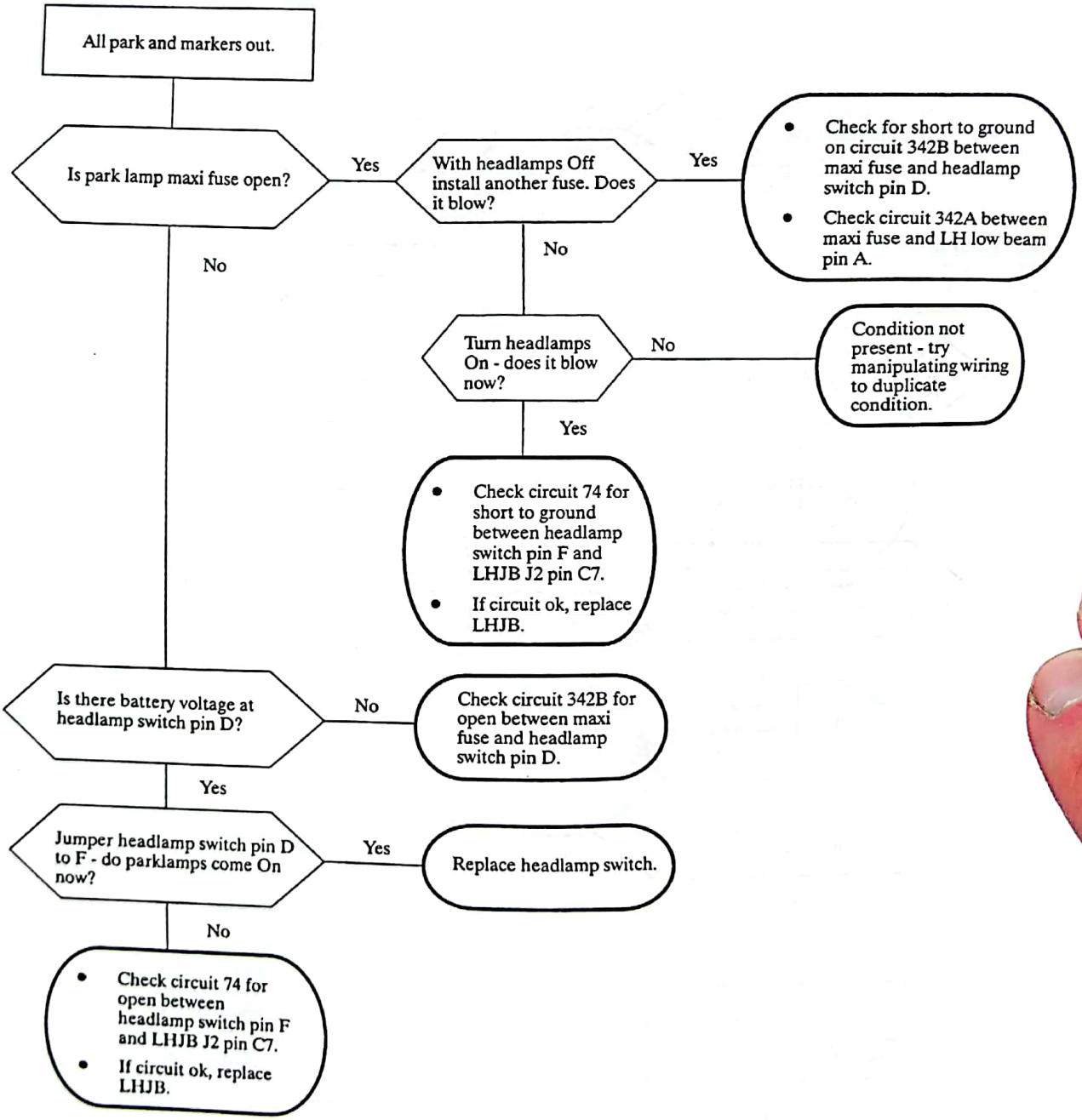
NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



CamScanner

ALL PARK AND MARKERS OUT

CHART 22

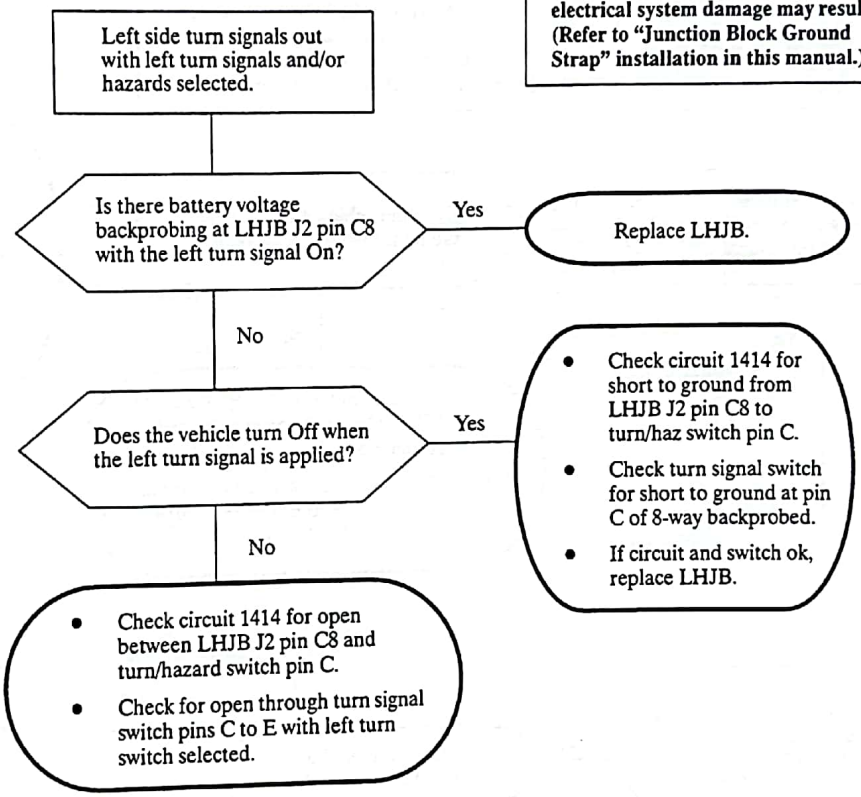


CamScanner

LEFT SIDE TURN SIGNALS OUT WITH LEFT TURN SIGNALS AND/OR HAZARDS SELECTED

CHART 23

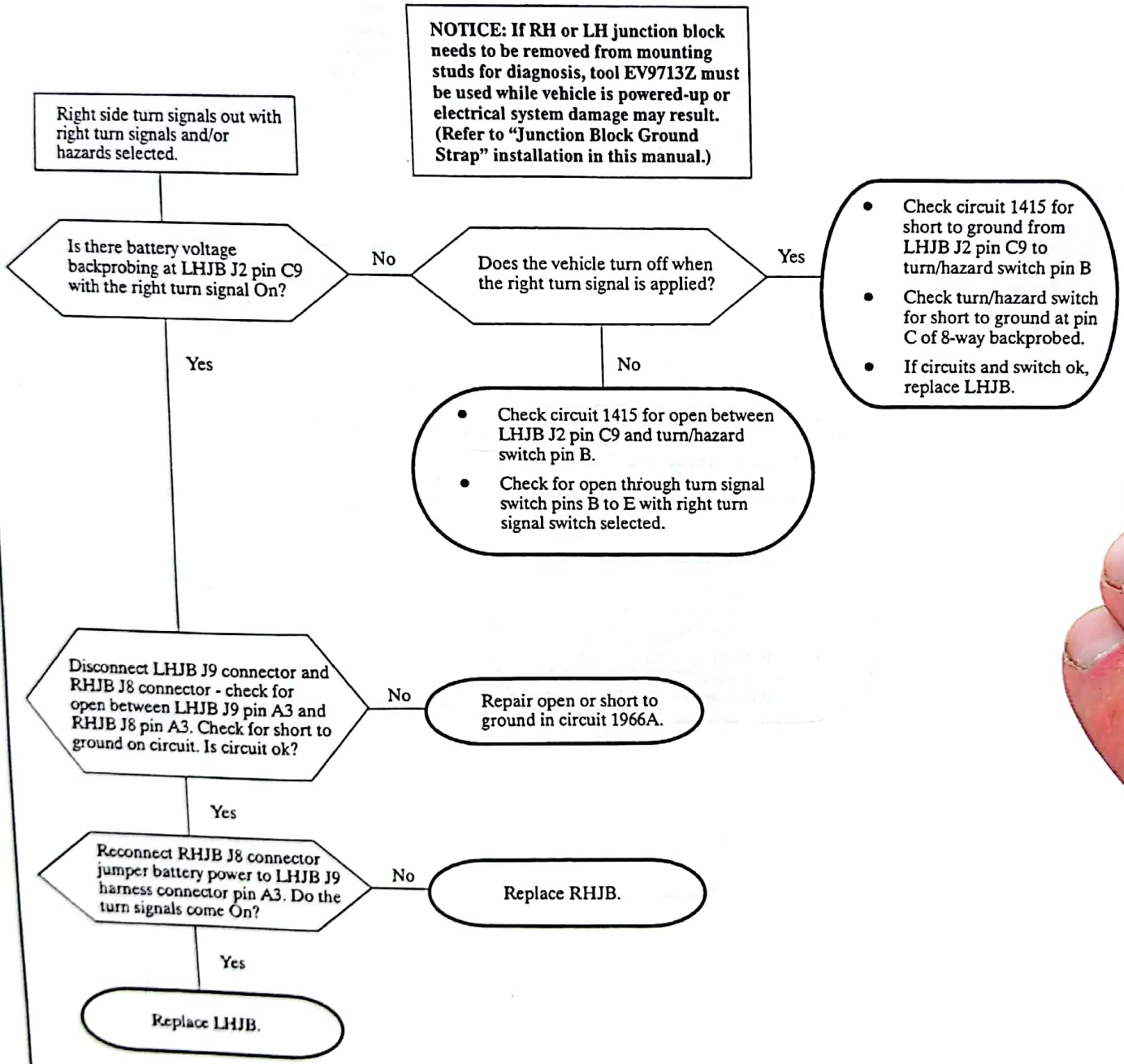
NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



CamScanner

RIGHT SIDE TURN SIGNALS OUT WITH RIGHT TURN SIGNALS AND/OR HAZARDS SELECTED

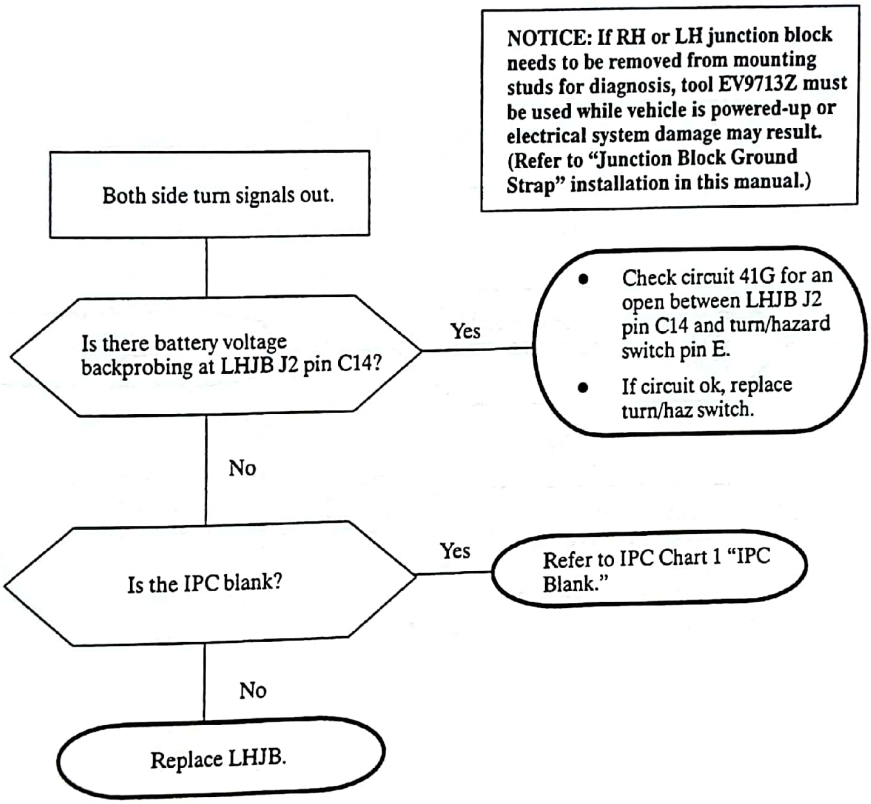
CHART 24



CamScanner

BOTH SIDE TURN SIGNALS OUT

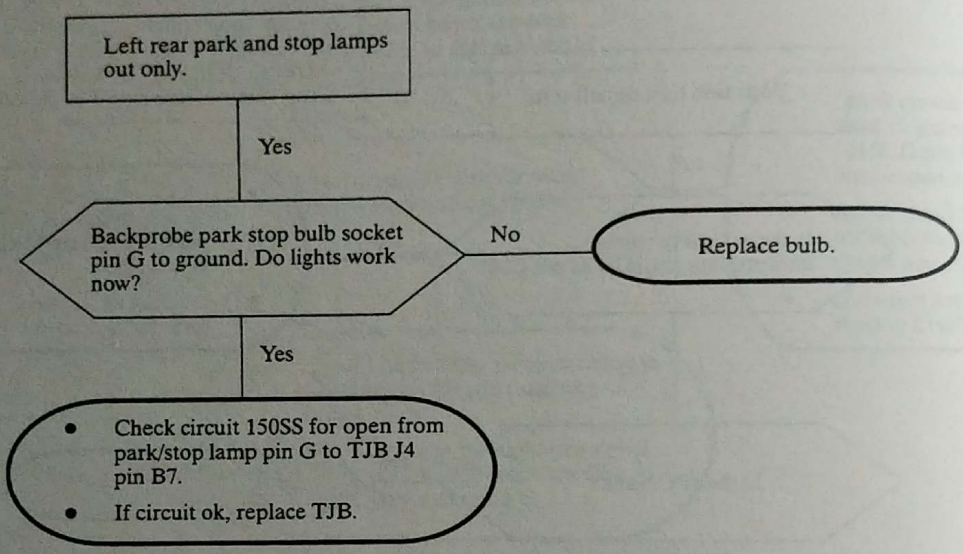
CHART 25



CamScanner

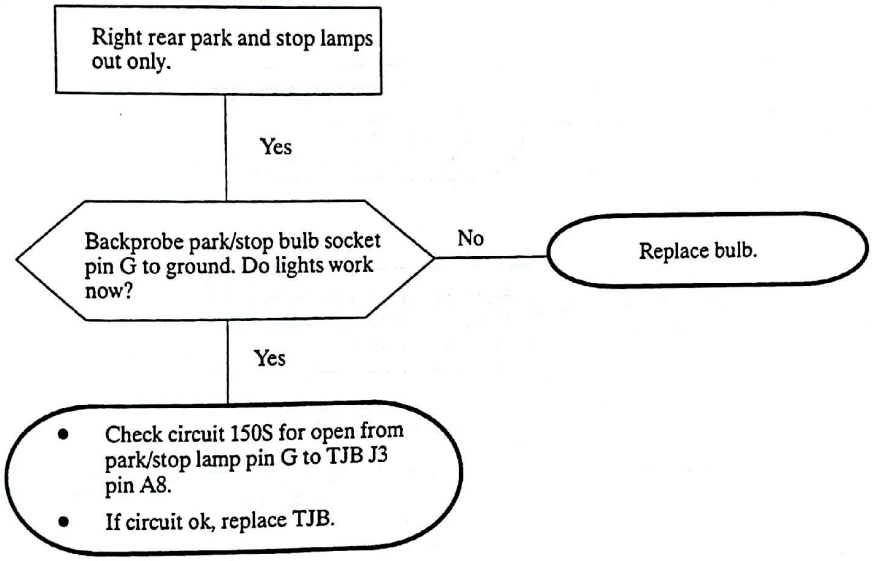
LEFT REAR PARK AND STOP LAMPS OUT ONLY

CHART 26



RIGHT REAR PARK AND STOP LAMPS OUT ONLY

CHART 27

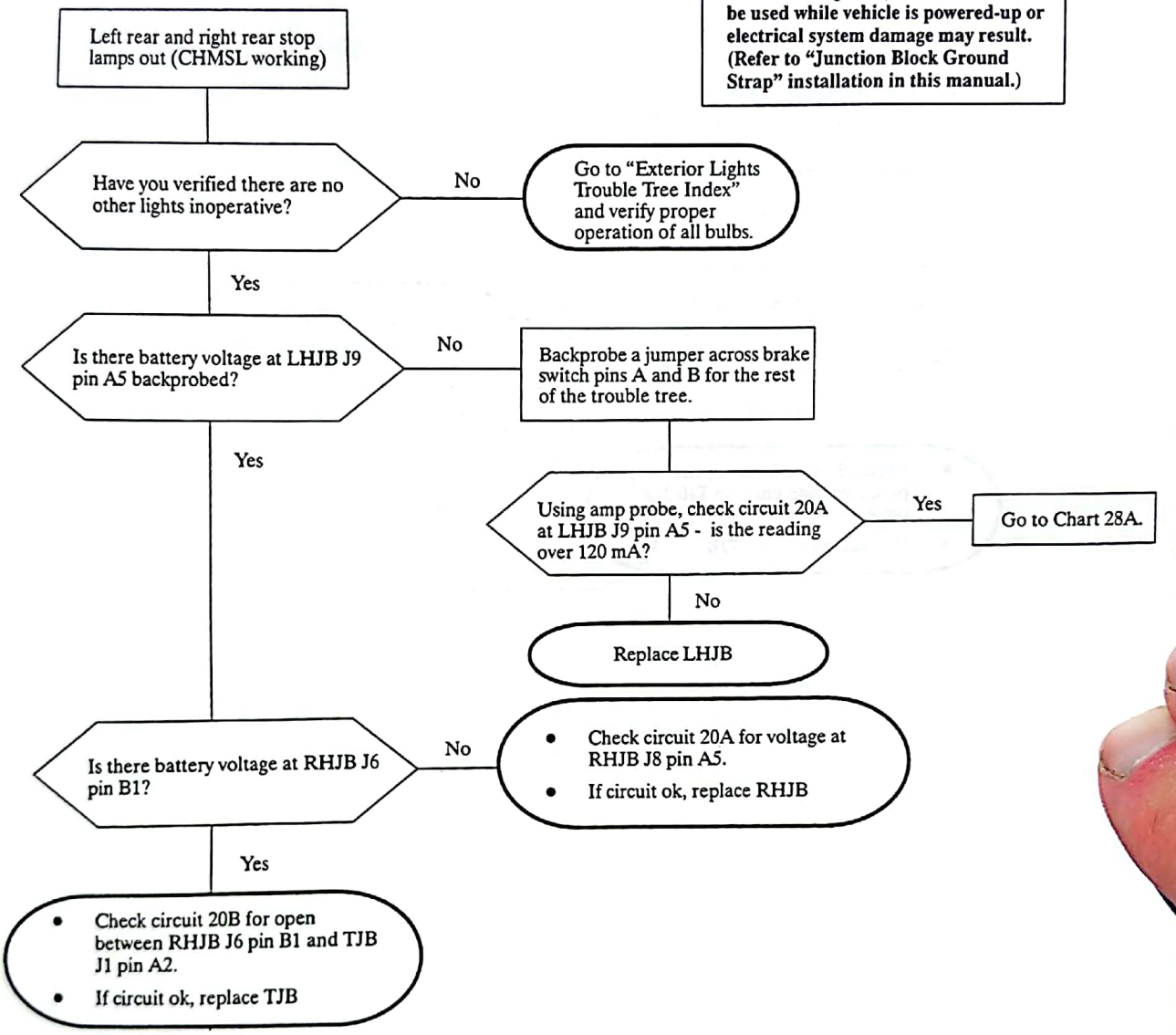


CamScanner

LEFT REAR AND RIGHT REAR STOP LAMPS OUT (CENTER HIGH MOUNTED STOP LAMP [CHMSL] WORKING)

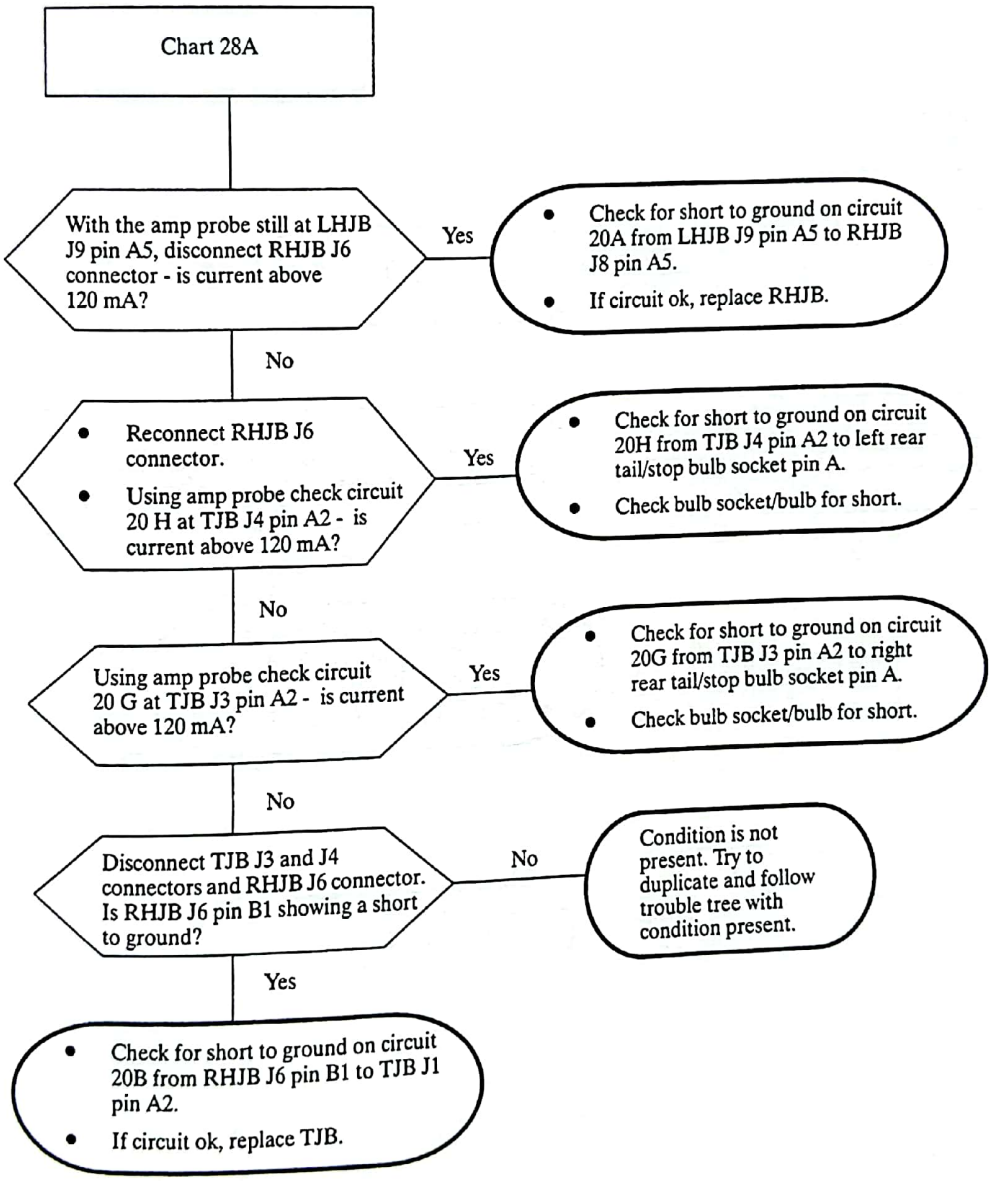
CHART 28

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



CamScanner

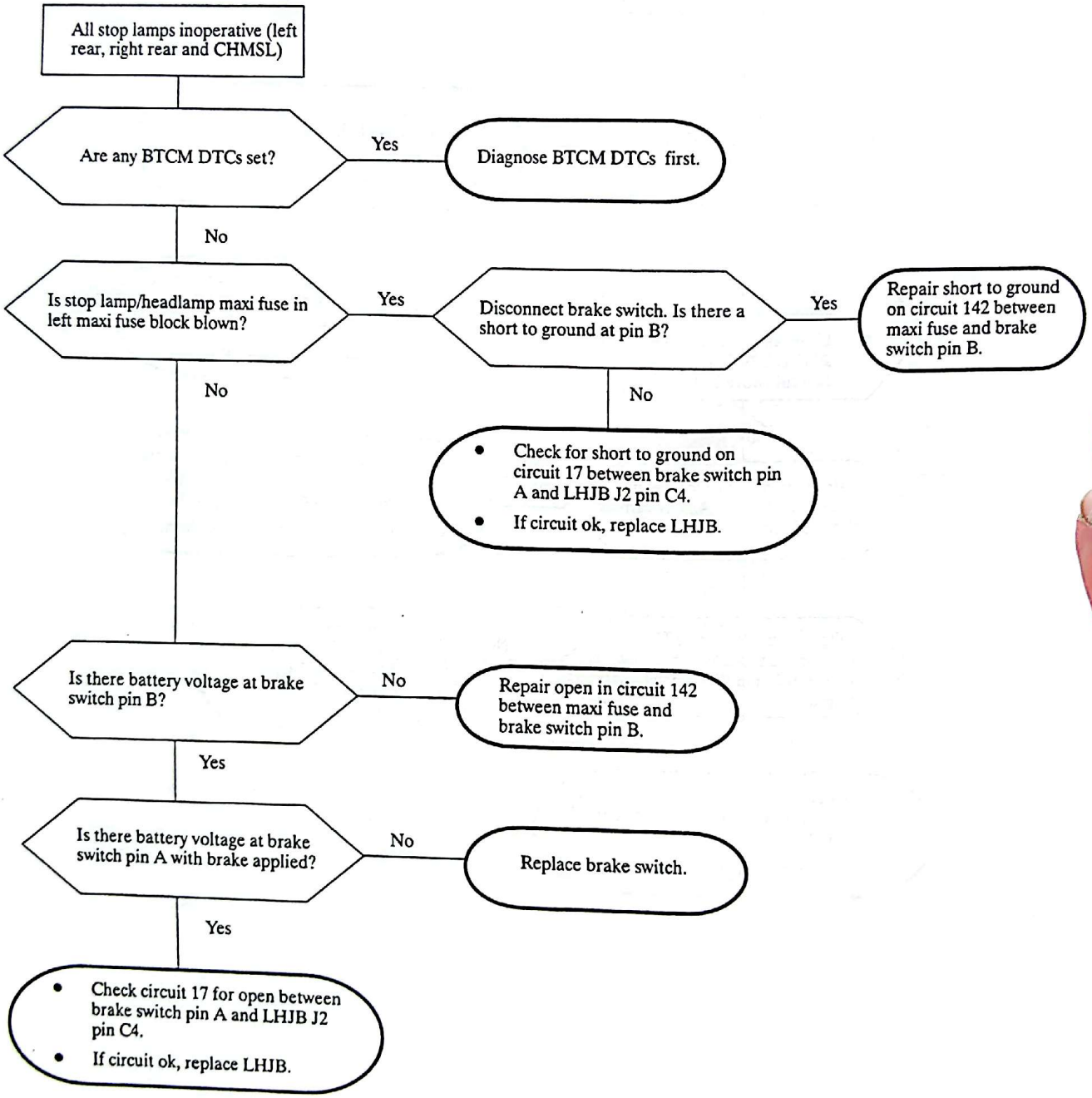
CHART 28A



CamScanner

ALL STOP LAMPS INOPERATIVE (LEFT REAR, RIGHT REAR AND CENTER HIGH MOUNTED STOP LAMP [CHMSL])

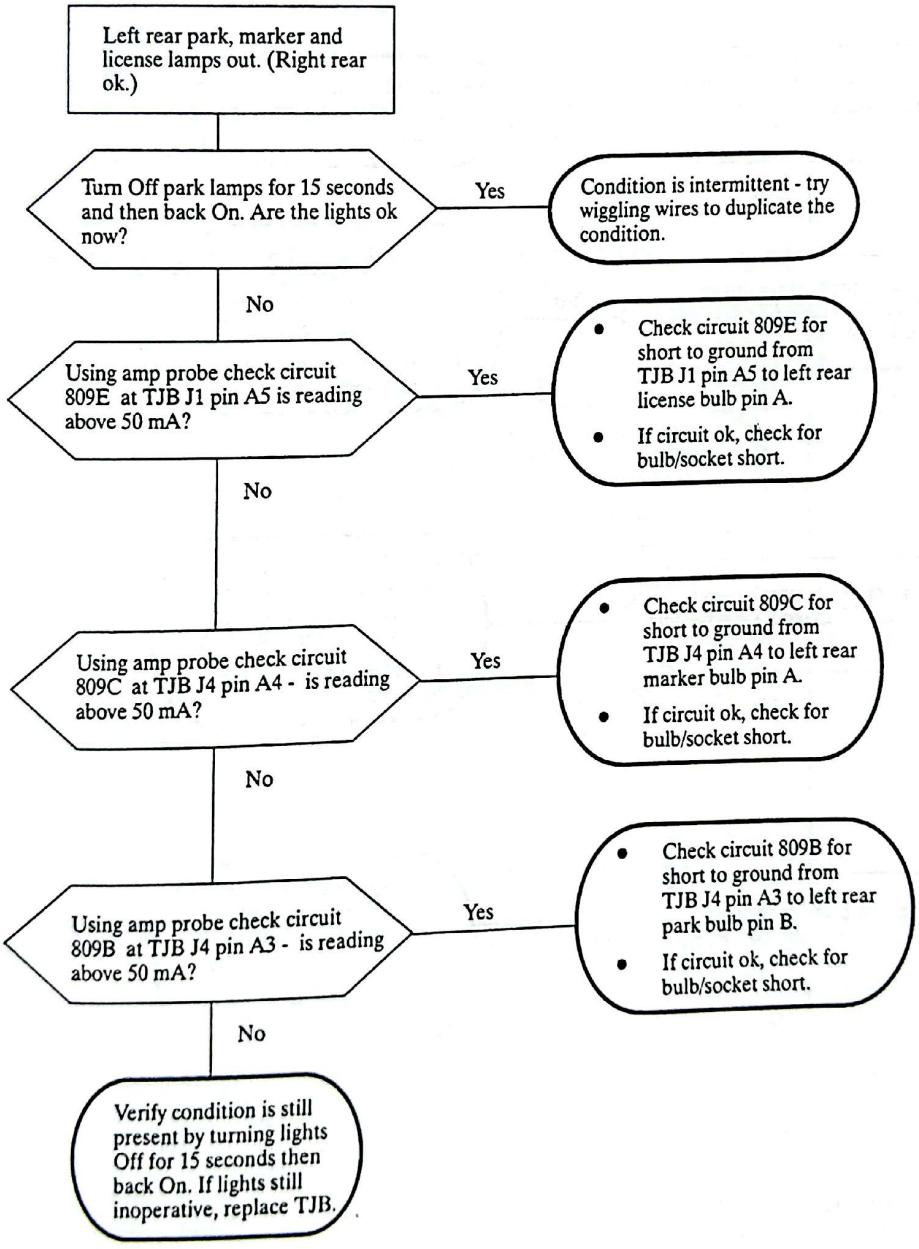
CHART 29



CamScanner

LEFT REAR PARK, MARKER AND LICENSE LAMPS OUT

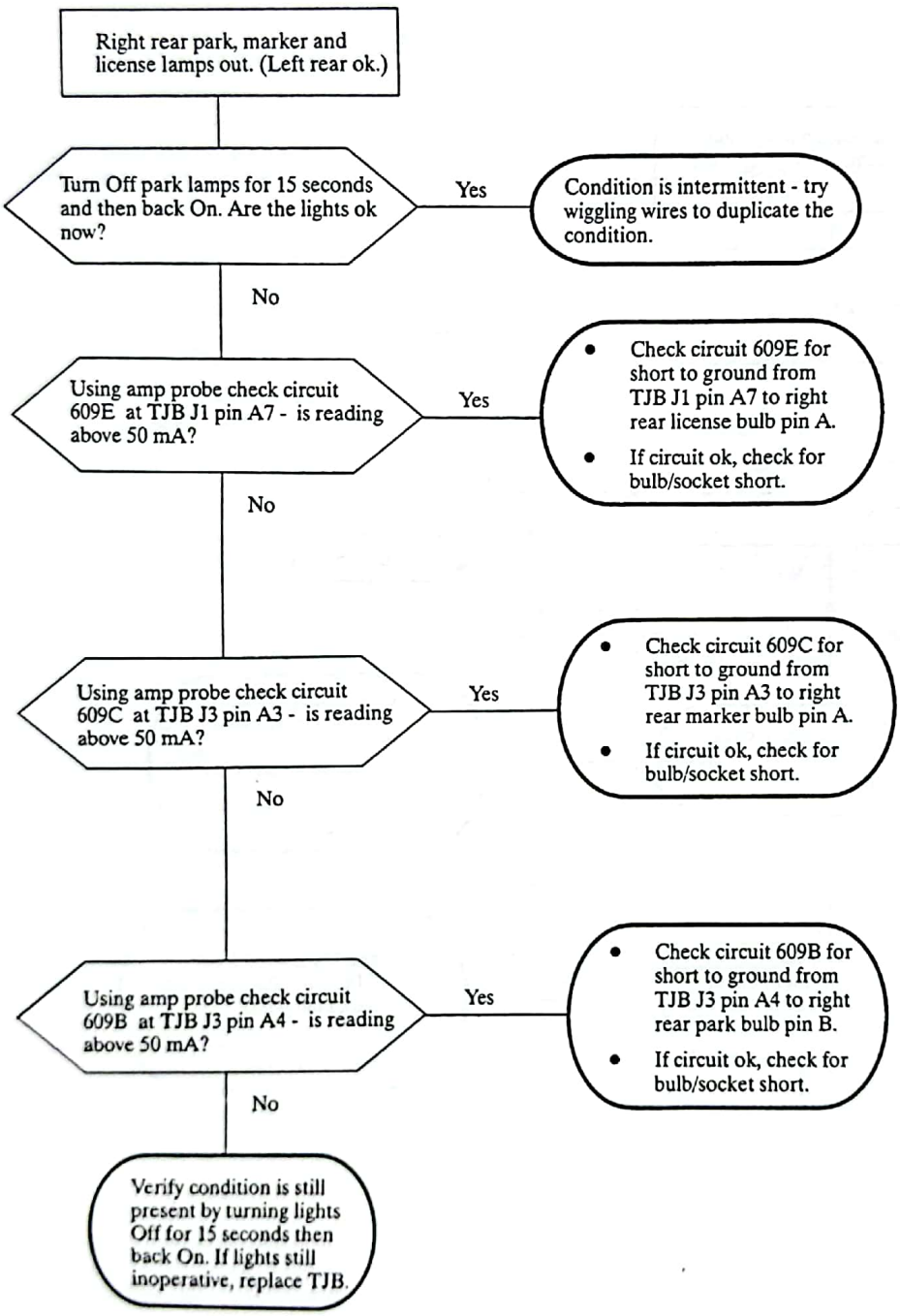
CHART 30



CamScanner

RIGHT REAR PARK, MARKER AND LICENSE LAMPS OUT

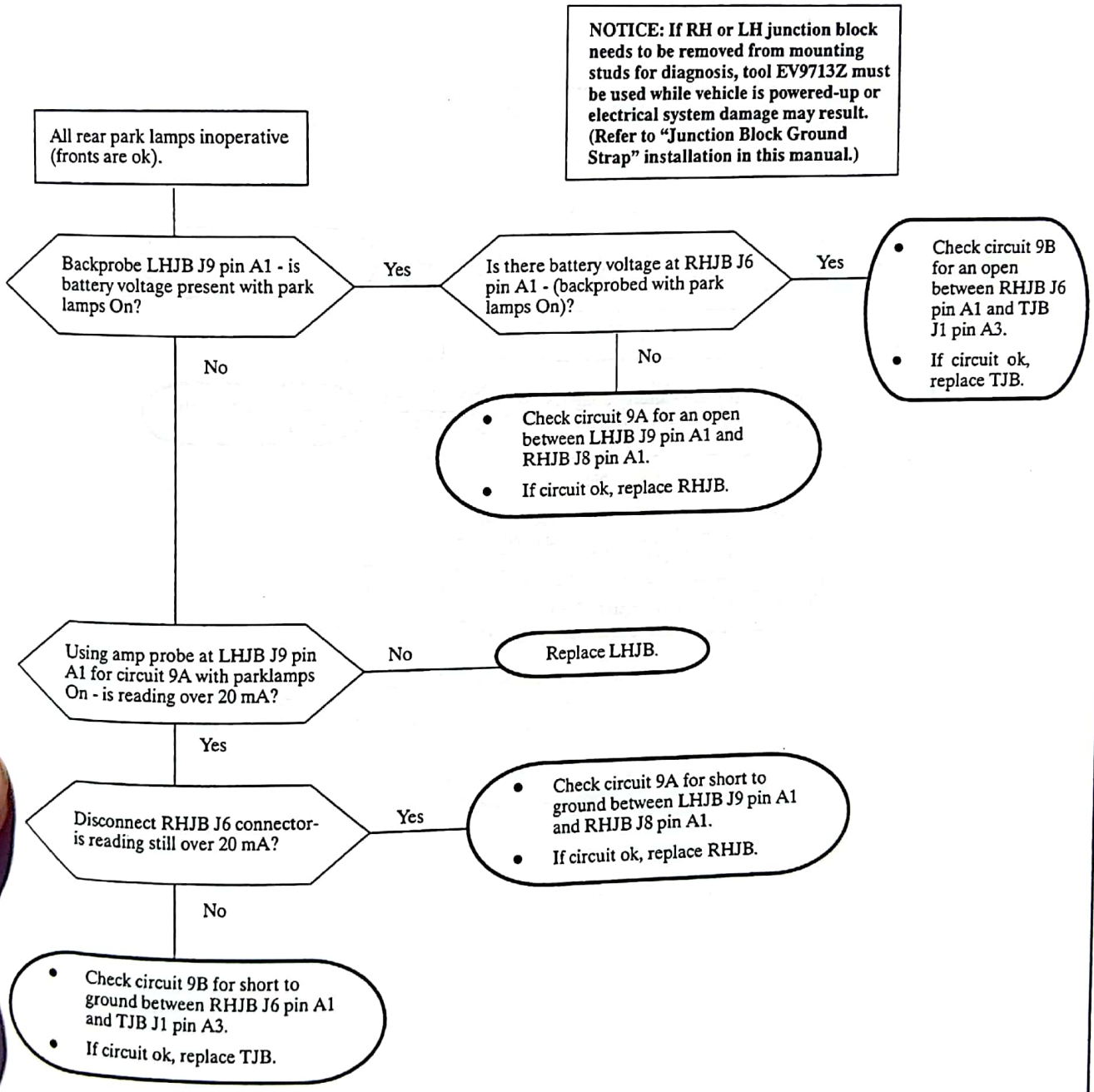
CHART 31



CamScanner

ALL REAR PARK LAMPS INOPERATIVE (FRONTS ARE OK)

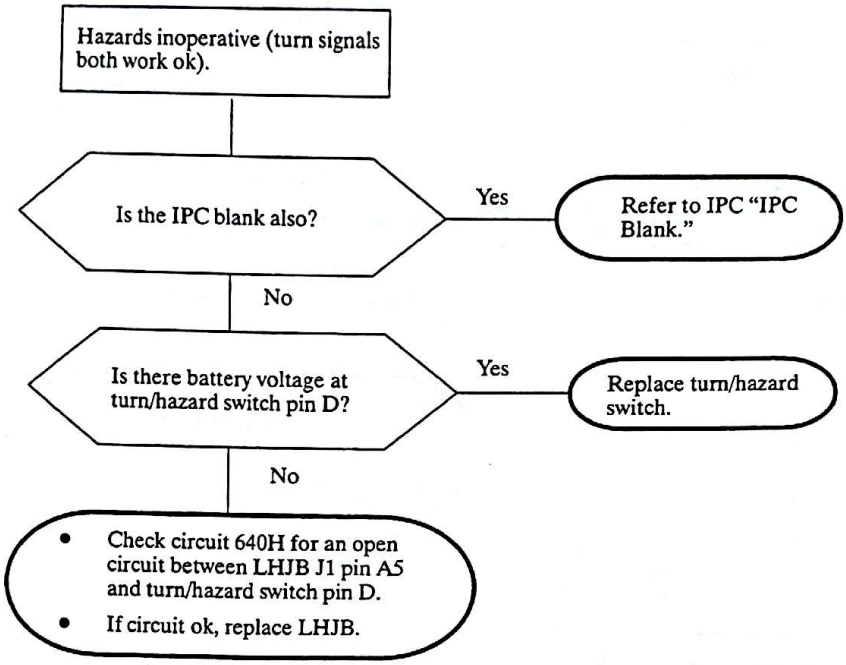
CHART 32



CamScanner

HAZARDS INOPERATIVE (TURN SIGNALS BOTH WORK OK)

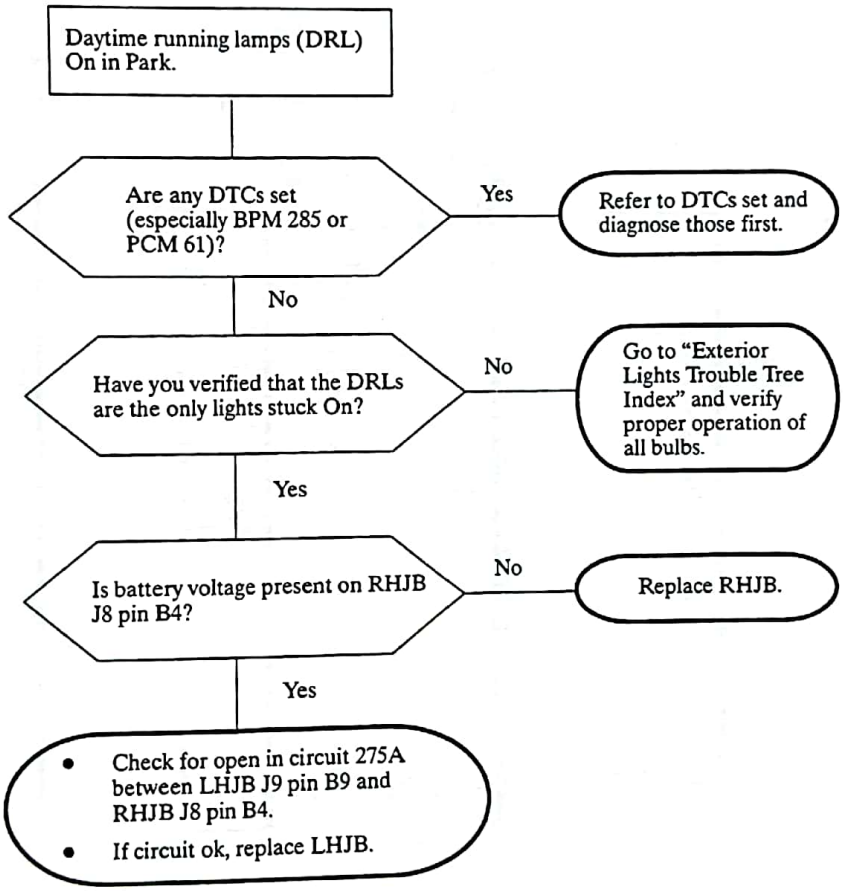
CHART 33



CamScanner

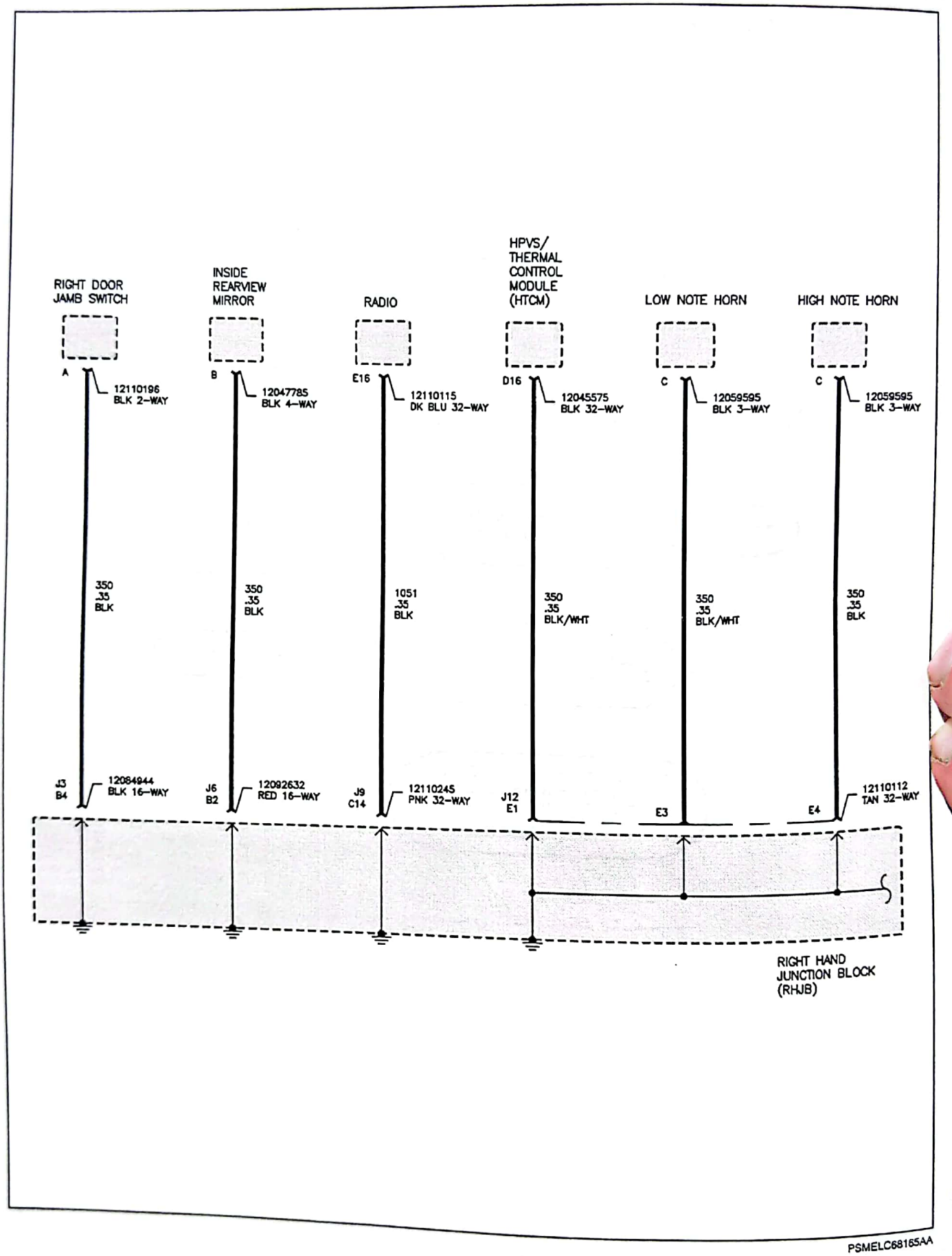
DAYTIME RUNNING LAMPS (DRL) ON IN PARK

CHART 34



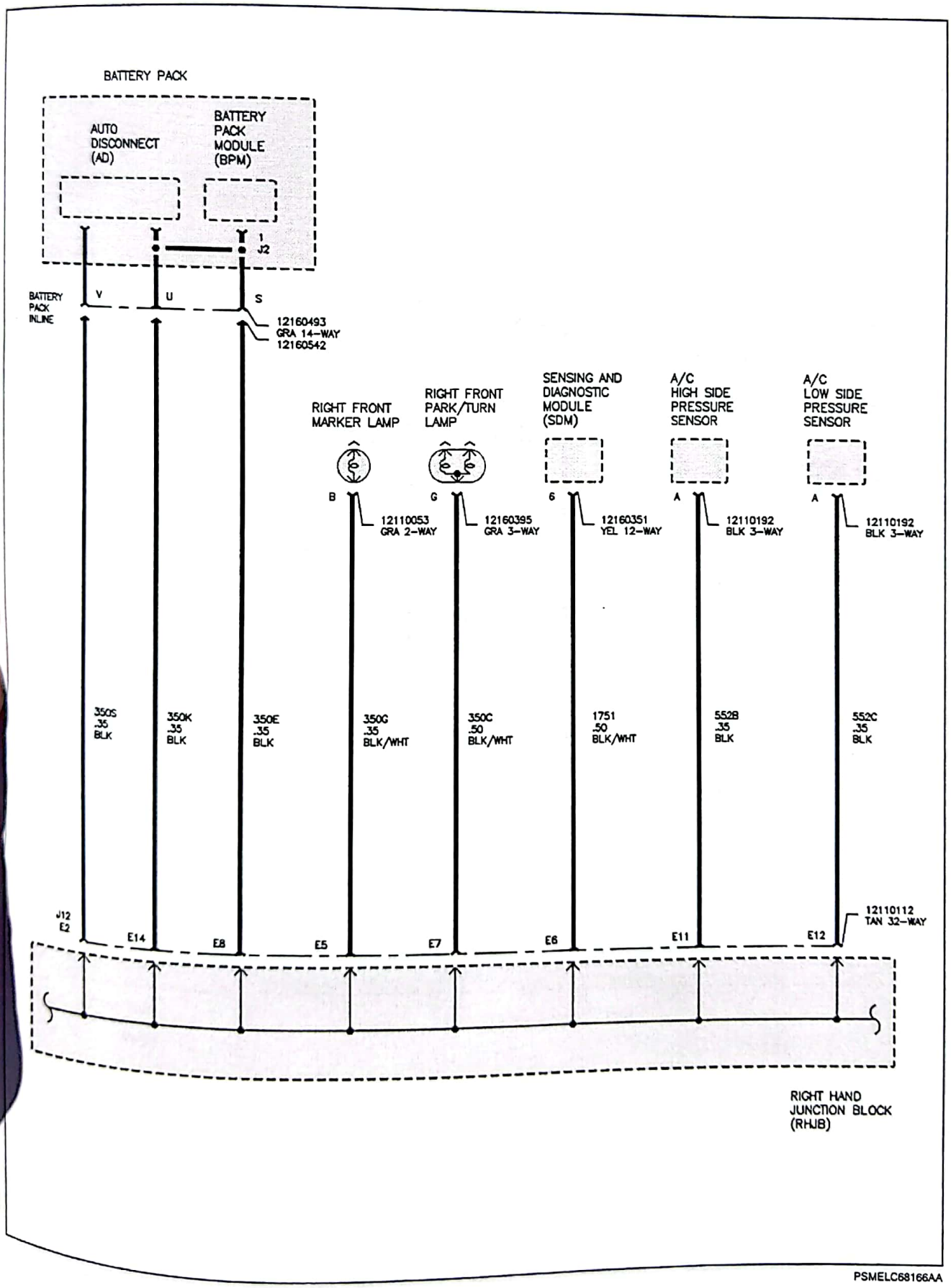
CamScanner

GROUND DISTRIBUTION



PSMELC68165AA

CamScanner



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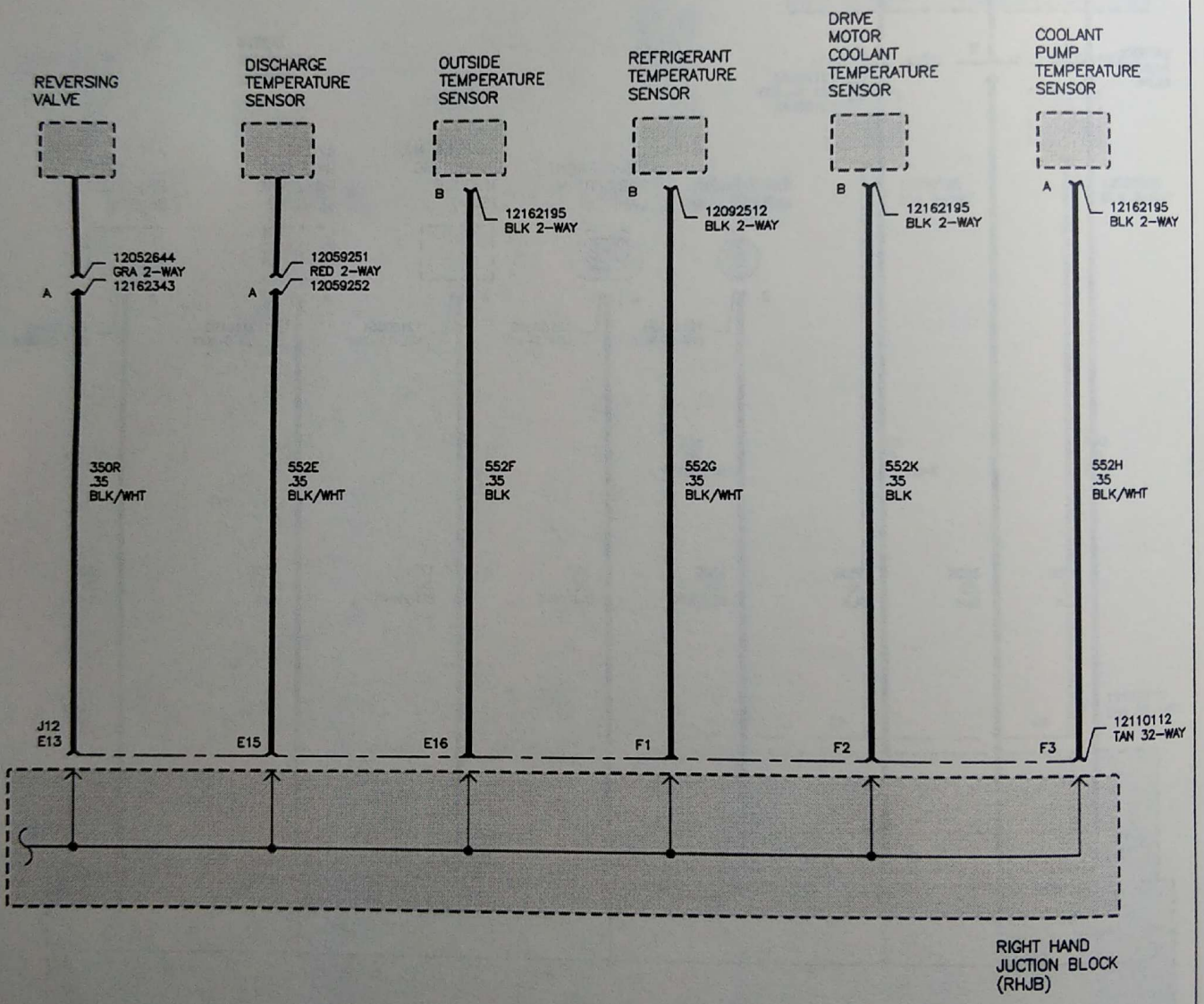

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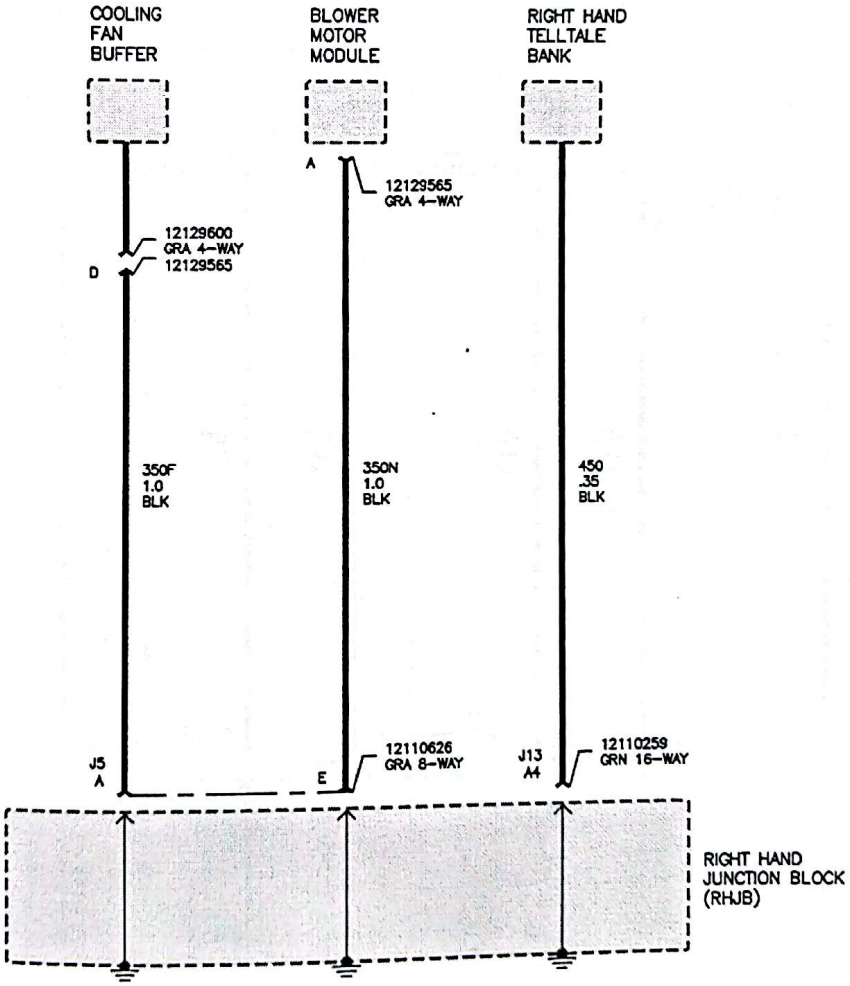

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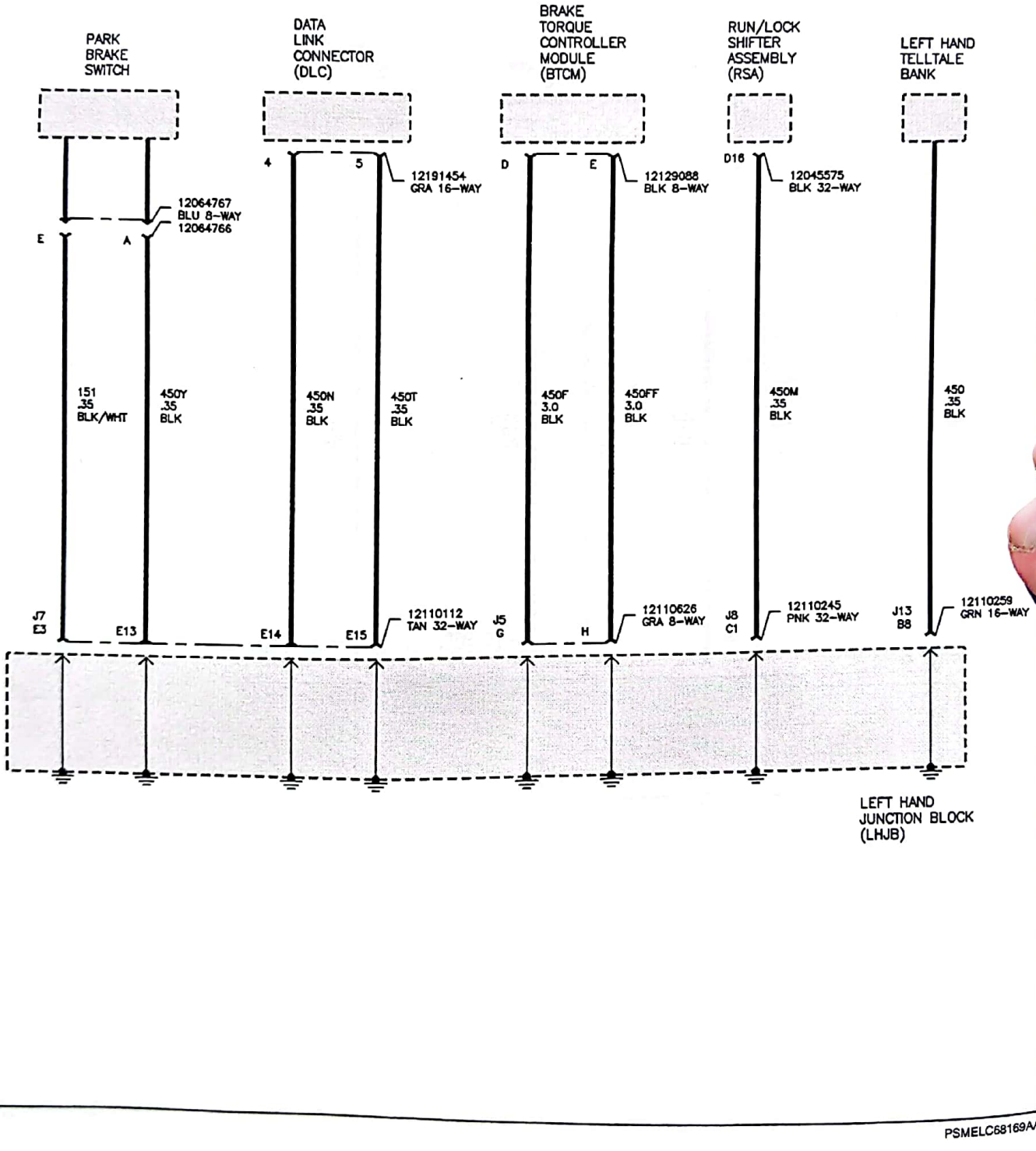

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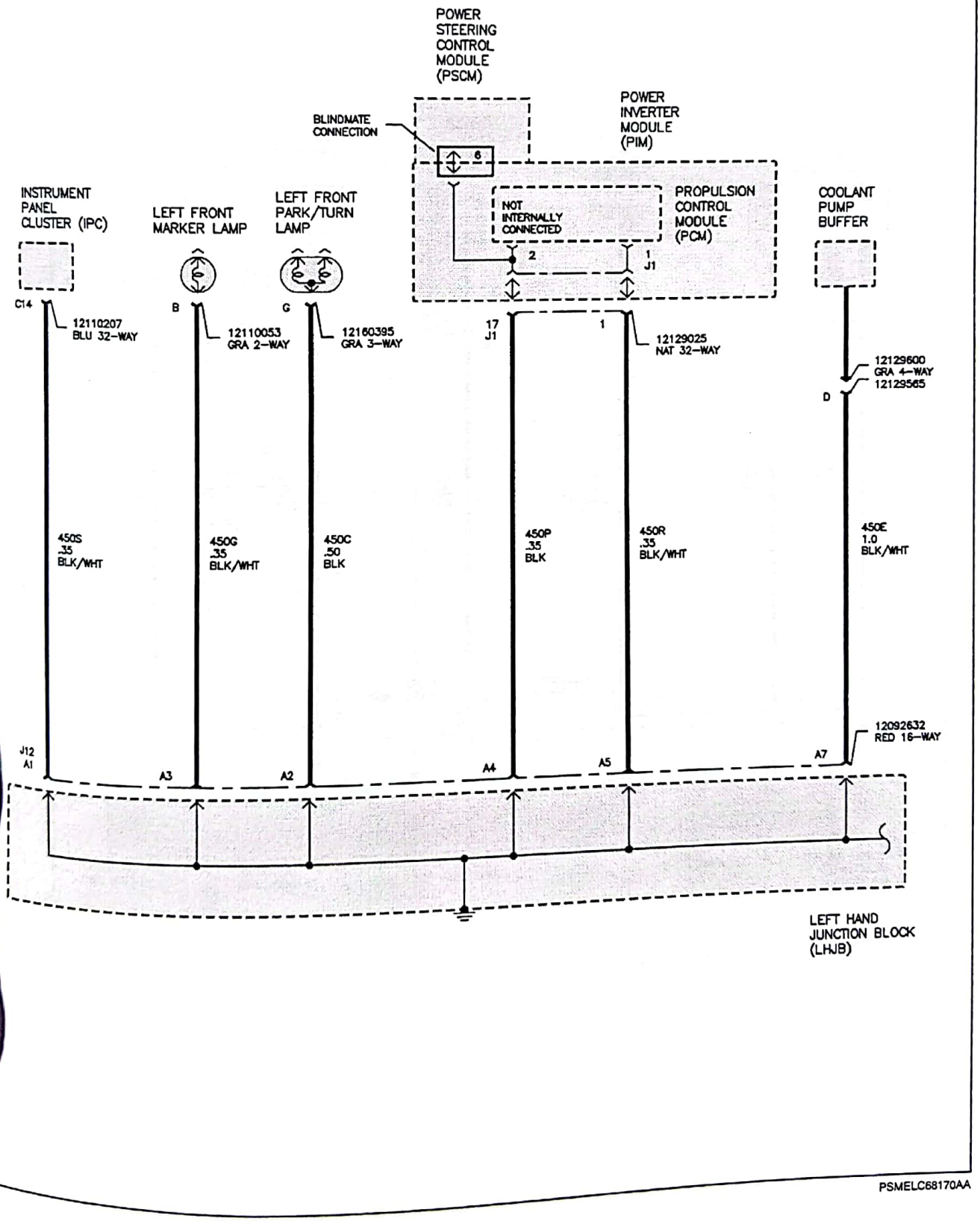
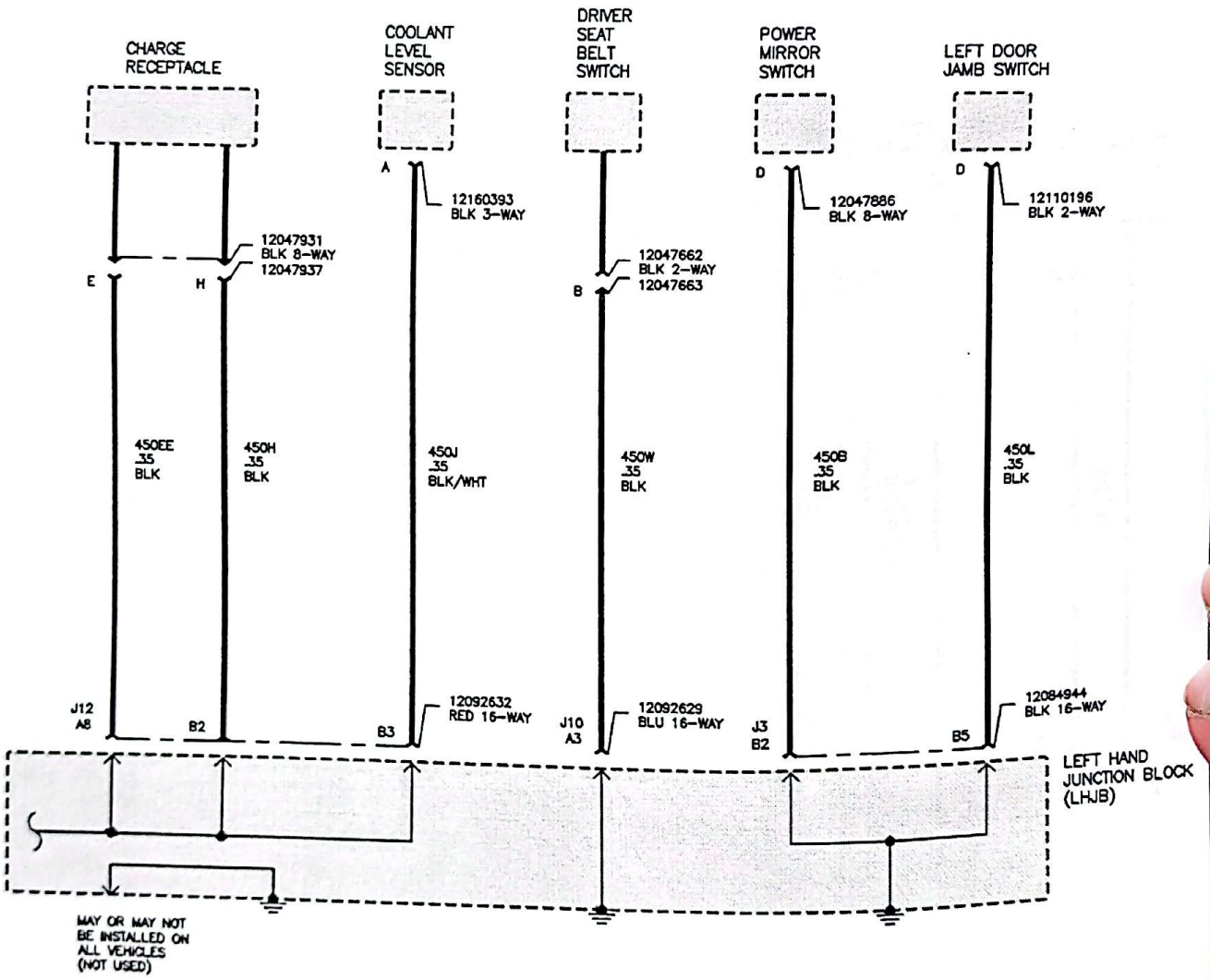


PSMELC68170AA

CamScanner



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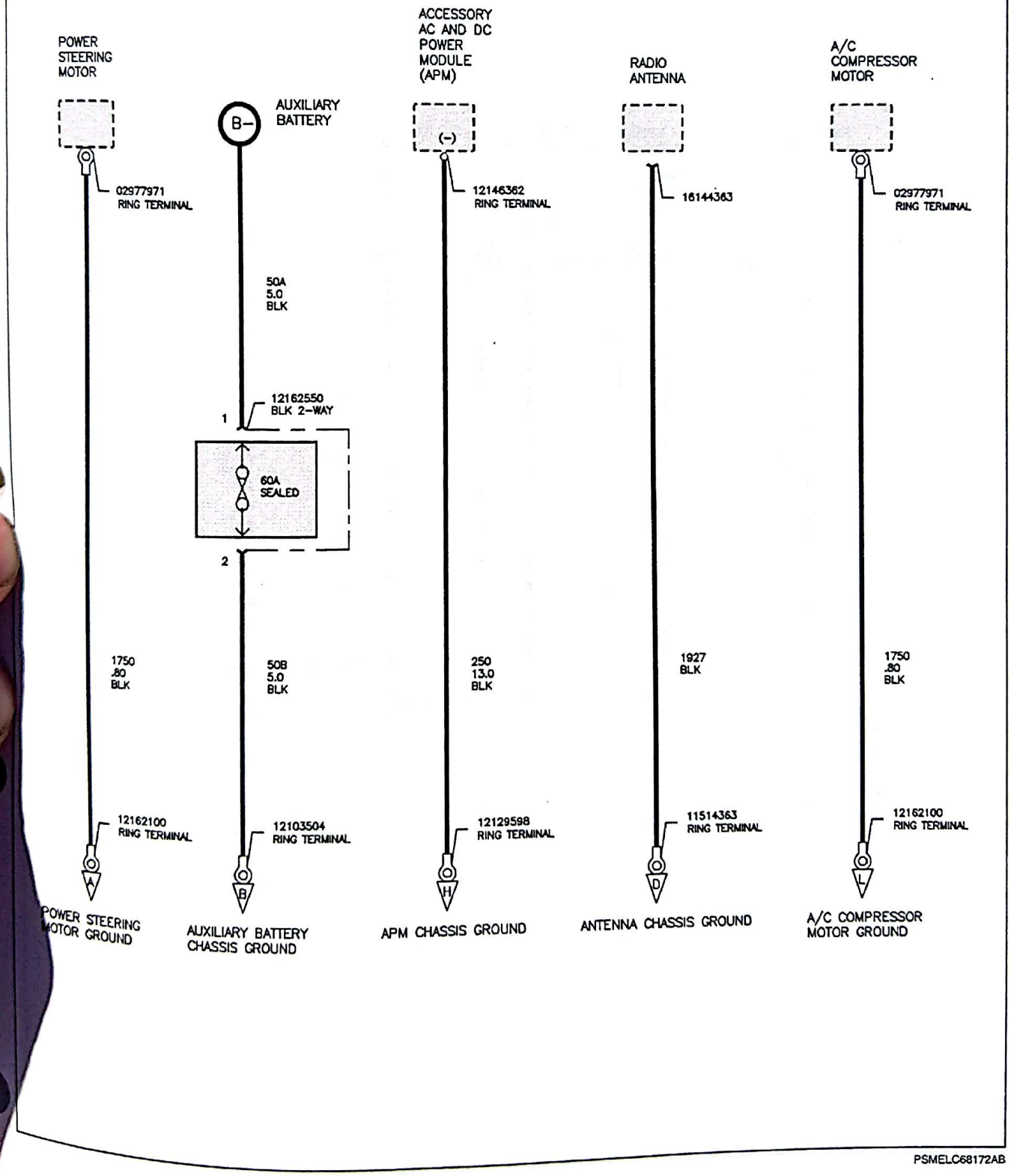
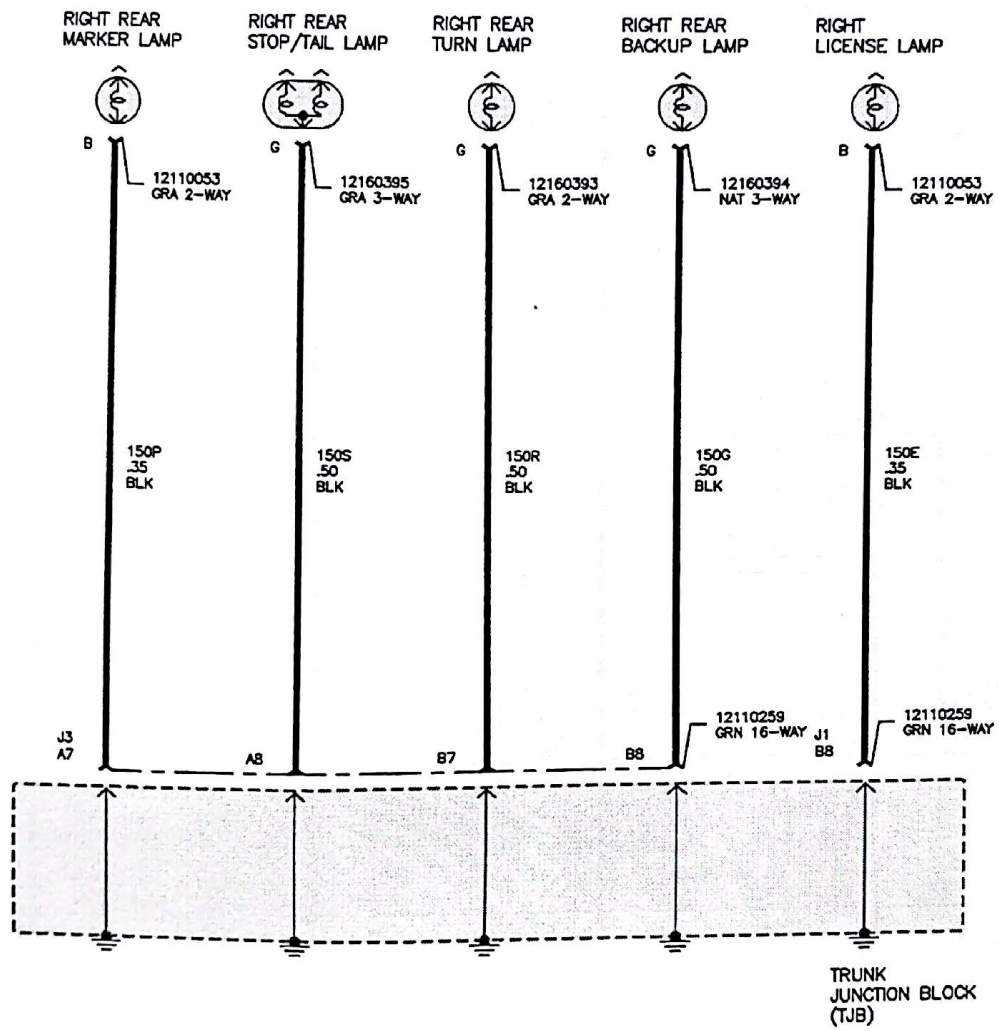
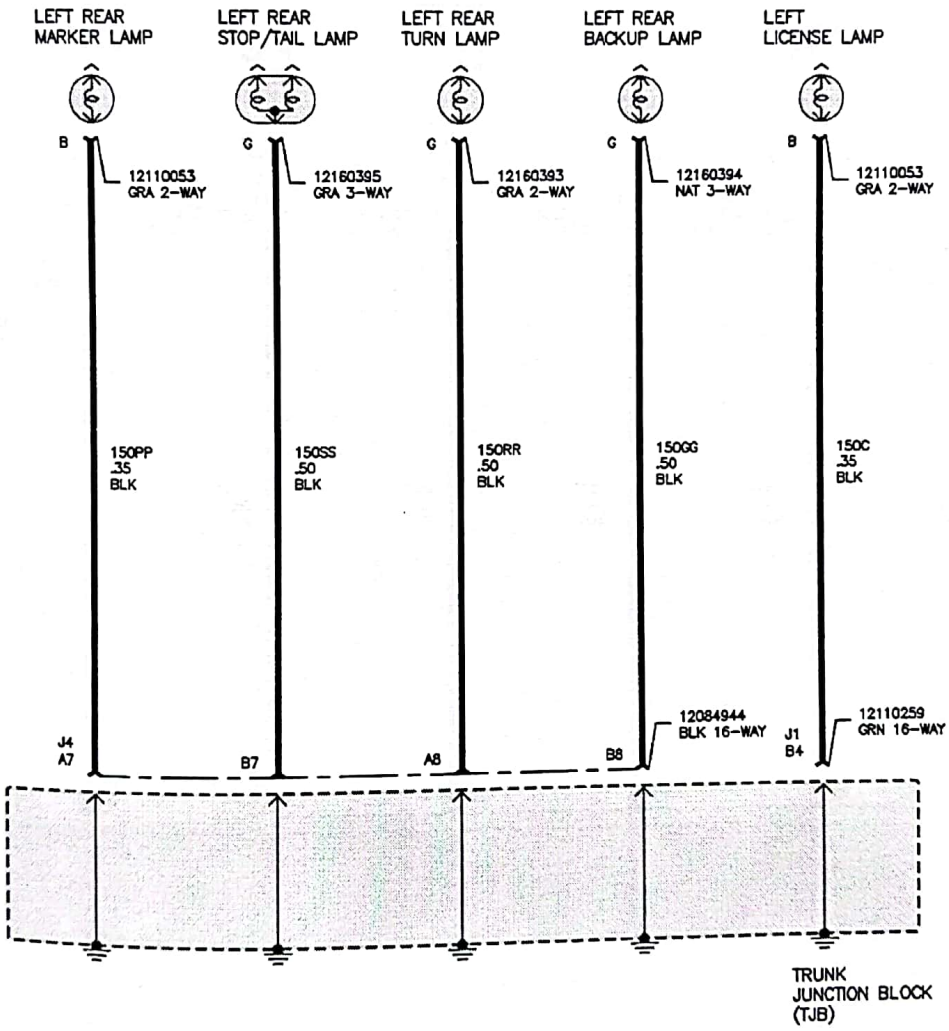

POWER STEERING MOTOR
02977971 RING TERMINAL
1750 .80 BLK
12162100 RING TERMINAL
A
POWER STEERING MOTOR GROUND
AUXILIARY BATTERY
B–
50A 5.0 BLK
12162550 BLK 2–WAY
1
60A SEALED
2
50B 5.0 BLK
12103504 RING TERMINAL
B
AUXILIARY BATTERY CHASSIS GROUND
ACCESSORY AC AND DC POWER MODULE (APM)
(–)
12146362 RING TERMINAL
250 13.0 BLK
12129598 RING TERMINAL
H
APM CHASSIS GROUND
RADIO ANTENNA
16144363
1927 BLK
11514363 RING TERMINAL
D
ANTENNA CHASSIS GROUND
A/C COMPRESSOR MOTOR
02977971 RING TERMINAL
1750 .80 BLK
12162100 RING TERMINAL
L
A/C COMPRESSOR MOTOR GROUND
PSMELC68172AB



PSMELC68173AA

CamScanner



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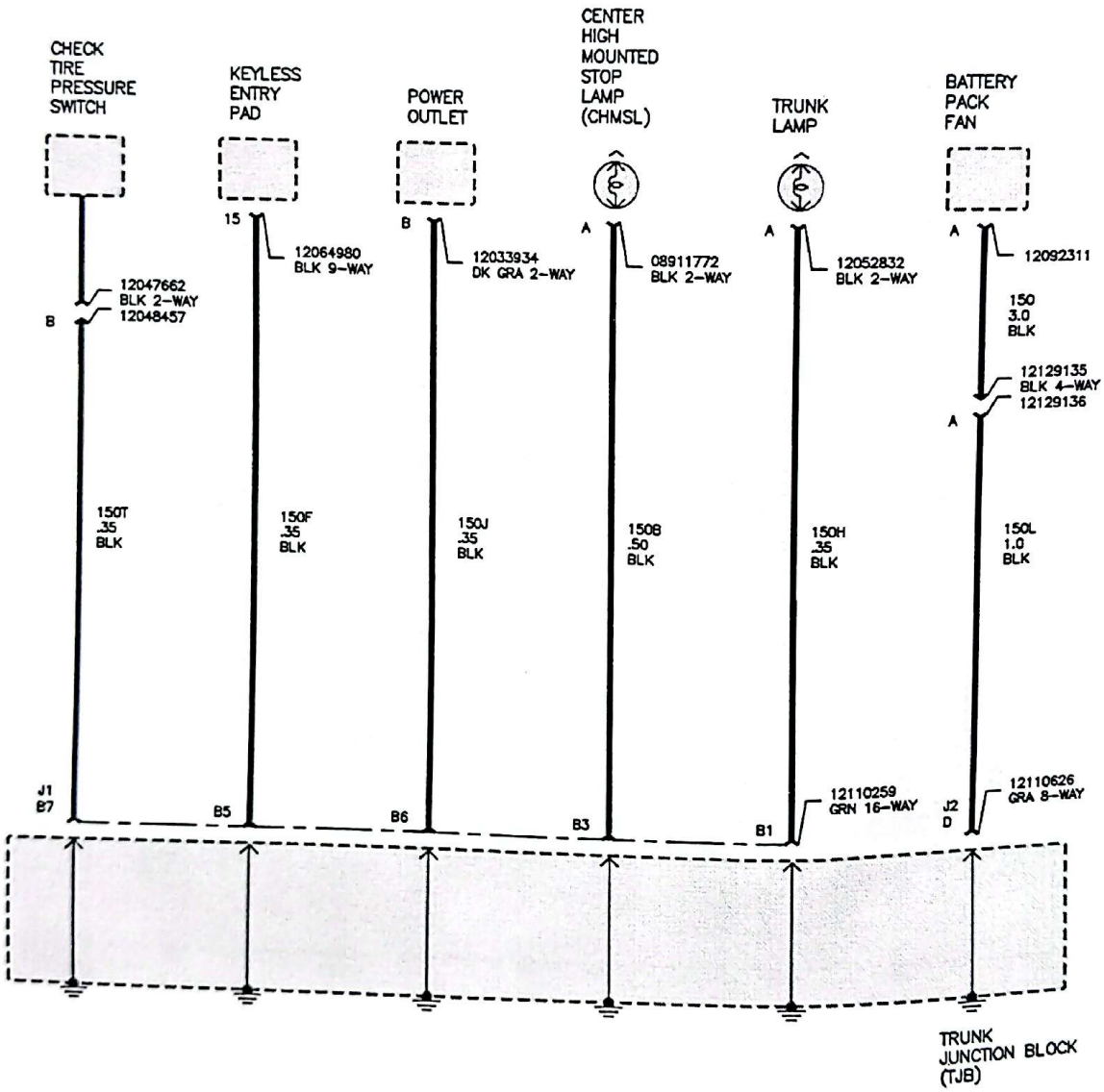

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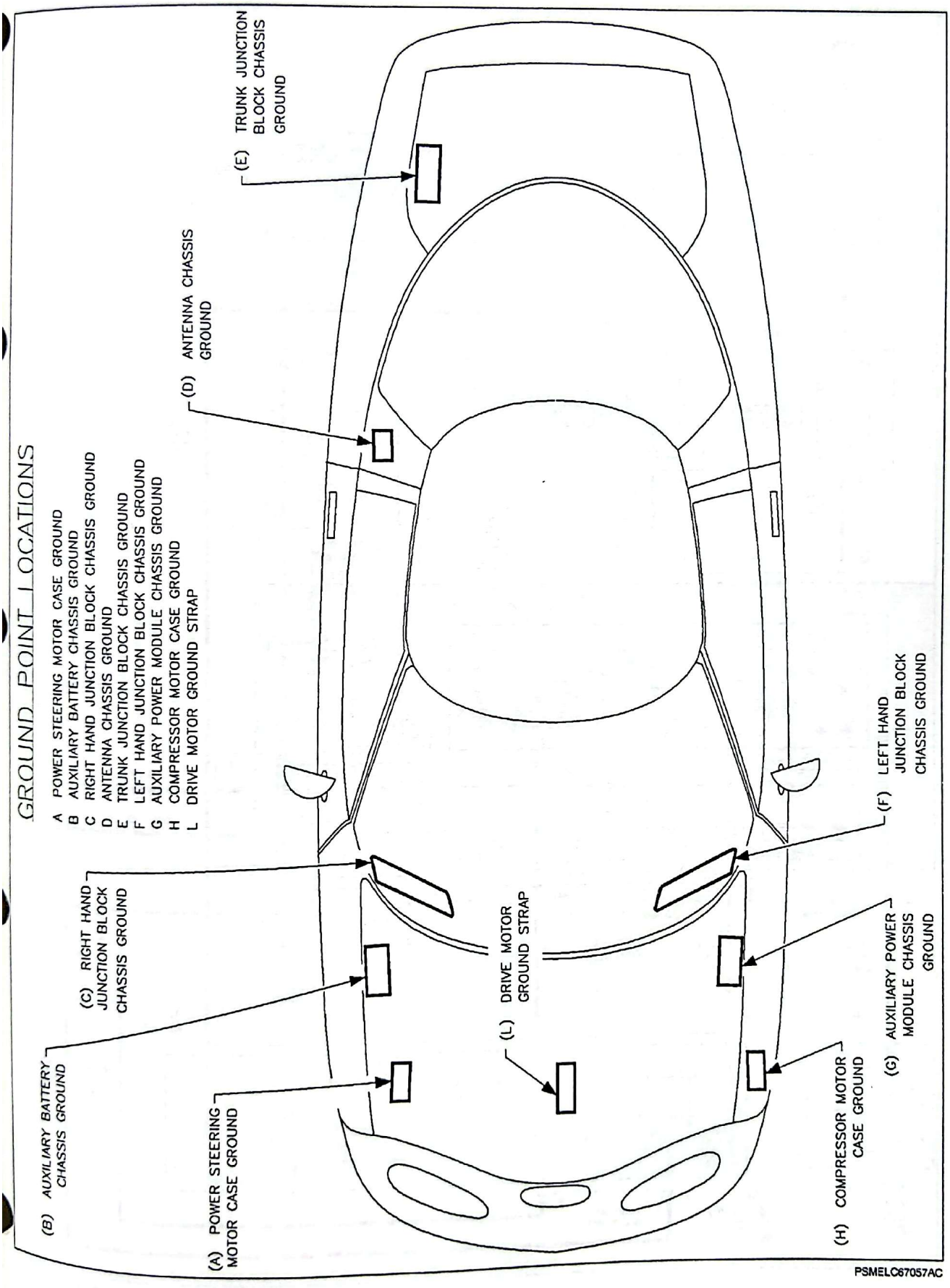
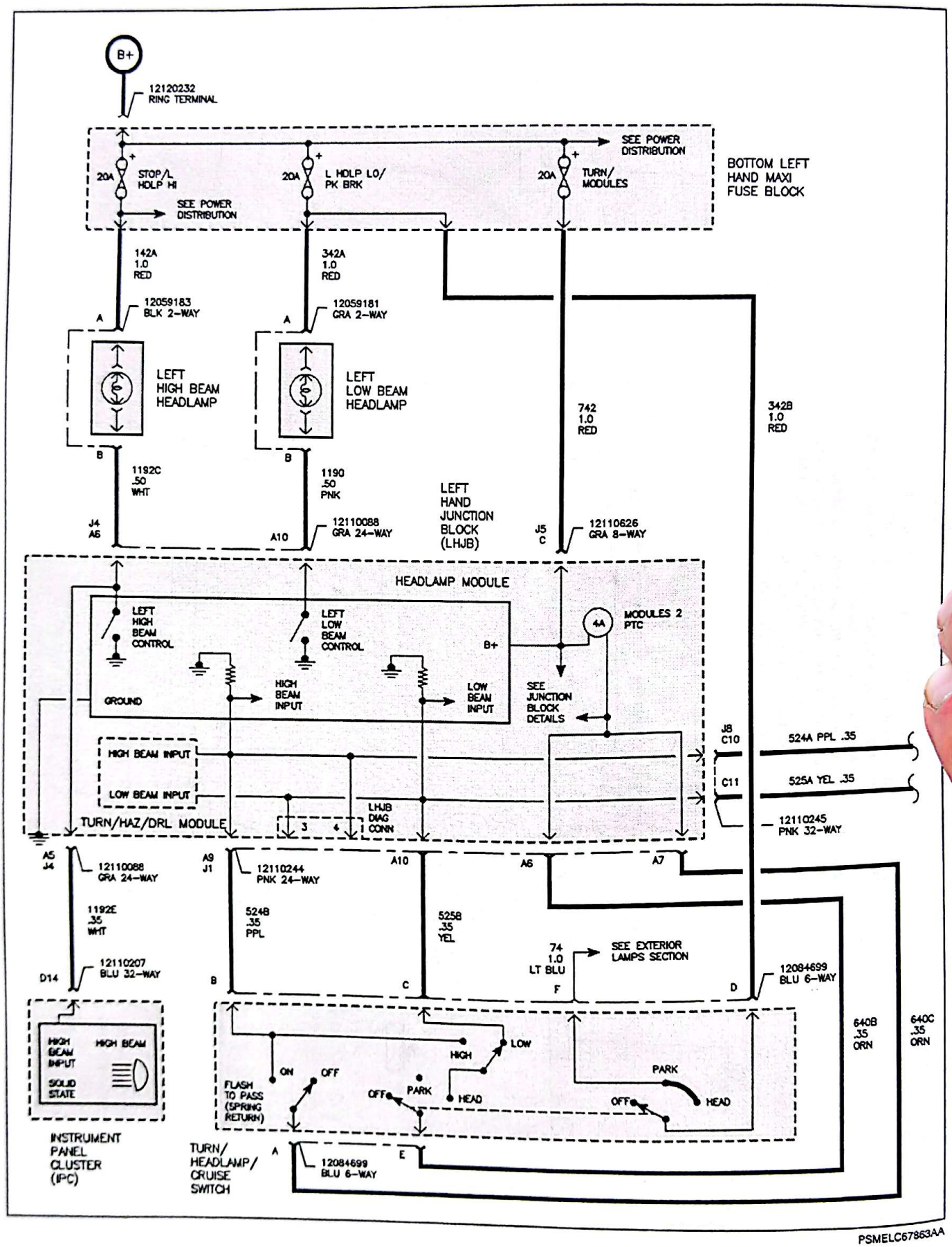
GROUND POINT LOCATIONS



HEADLAMPS



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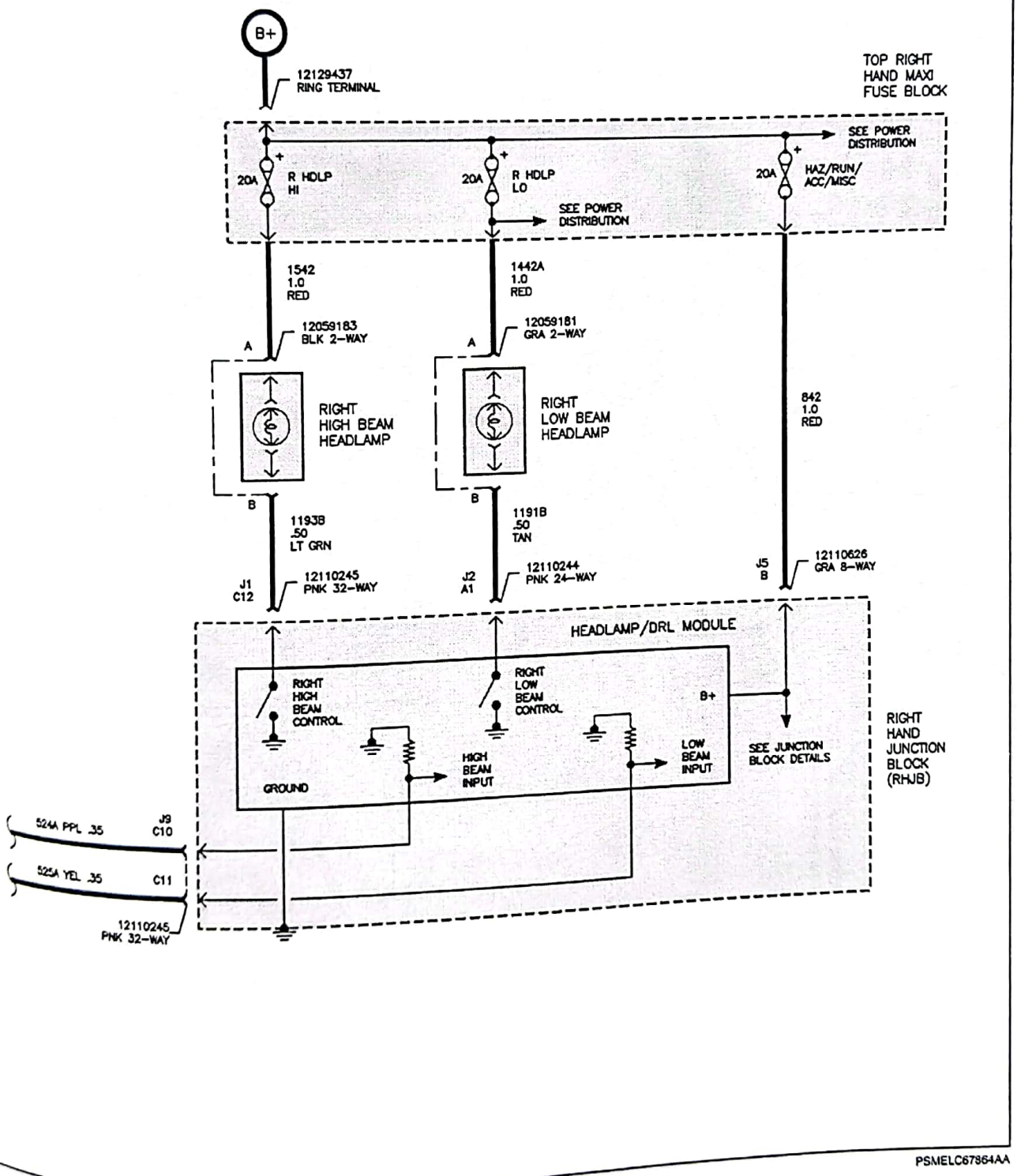

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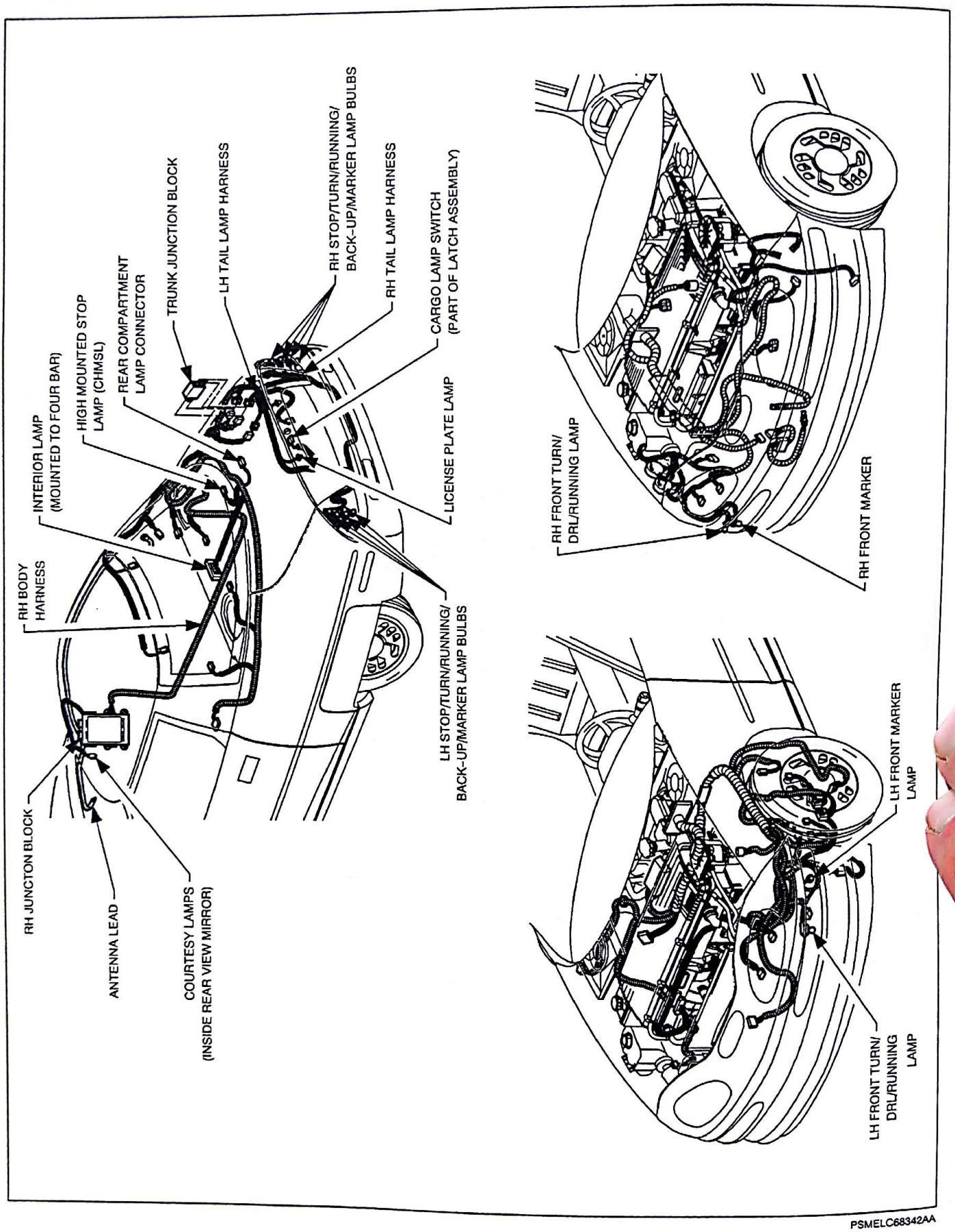
HEADLAMP COMPONENT LOCATION VIEWS



HEADLAMPS

CIRCUIT OPERATION

Four dedicated maxi fuses supply battery power to the four headlamps at all times. The left side headlamps receive power from two dedicated fuses in the LH maxi fuse block, and the right side from the RH maxi fuse block. Each of the headlamps have a dedicated ground that is controlled by the headlamp module in the left hand junction block (LHJB) or right hand junction block (RHJB).

Battery power flows through the LHJB to the headlamp switch. When the headlamp switch is turned On in low beams, power flows through circuit 525 back to the headlamp module in the LHJB and through the LHJB to the headlamp module in the RHJB. The respective headlamp modules then ground the low beam headlamps to turn them On.

If high beams are selected, power flows from the headlight switch through circuit 524 in the same way to the LHJB and through the LHJB to the RHJB to the headlamp modules. The headlamp modules then each ground the high beam headlamps on their respective sides.

The high beam indicator in the IPC is turned On when the IPC senses circuit 1192E drop below 1.5 volts.

FLASH TO PASS

The flash to pass feature allows high beams to be turned On momentarily while the headlamp switch is turned Off. If the headlamp switch is pulled (as if switching between low and high beams) with the headlamps Off, the high beam circuit 524 is powered to the headlamp modules. This power remains as long as the switch is held in the rearward position. This is the same circuit and signal to the headlamp modules as if normal high beam headlamps were selected, and the modules react by providing a ground to the high beam lamps as long as circuit 524 remains powered. If the vehicle speed is 40 km/h (25 mph) or less when flash to pass is activated the pedestrian alert is also sounded. For more information on the pedestrian alert, refer to the Horn section in this manual.

SYSTEM CHECK

IMPORTANT: Check the operation of all headlamp functions before selecting a trouble tree, otherwise misdiagnosis could occur. Verify proper operation of Hi beams, Lo beams, and flash to pass and note whether one or both bulbs in each of these cases is affected. Then pick the trouble tree that matches the symptom of the vehicle you are working on.

HEADLAMPS TROUBLE TREE INDEX

- Chart 1 – Left Headlamp High Beam Inoperative Only
- Chart 2 – Right Headlamp High Beam Inoperative Only
- Chart 3 – Left Headlamp Low Beam Inoperative Only
- Chart 4 – Right Headlamp Low Beam Inoperative Only
- Chart 5 – Left Headlamp High Beam On All the Time
- Chart 6 – Right Headlamp High Beam On All the Time
- Chart 7 – Left Headlamp Low Beam On All the Time
- Chart 8 – Right Headlamp Low Beam On All the Time
- Chart 9 – Only High Beams Inoperative
- Chart 10 – Only Low Beams Inoperative
- Chart 11 – Both High Beams On All the Time
- Chart 12 – Both Low Beams On All the Time
- Chart 13 – Flash to Pass Inoperative/Lo and Hi Beams Inoperative

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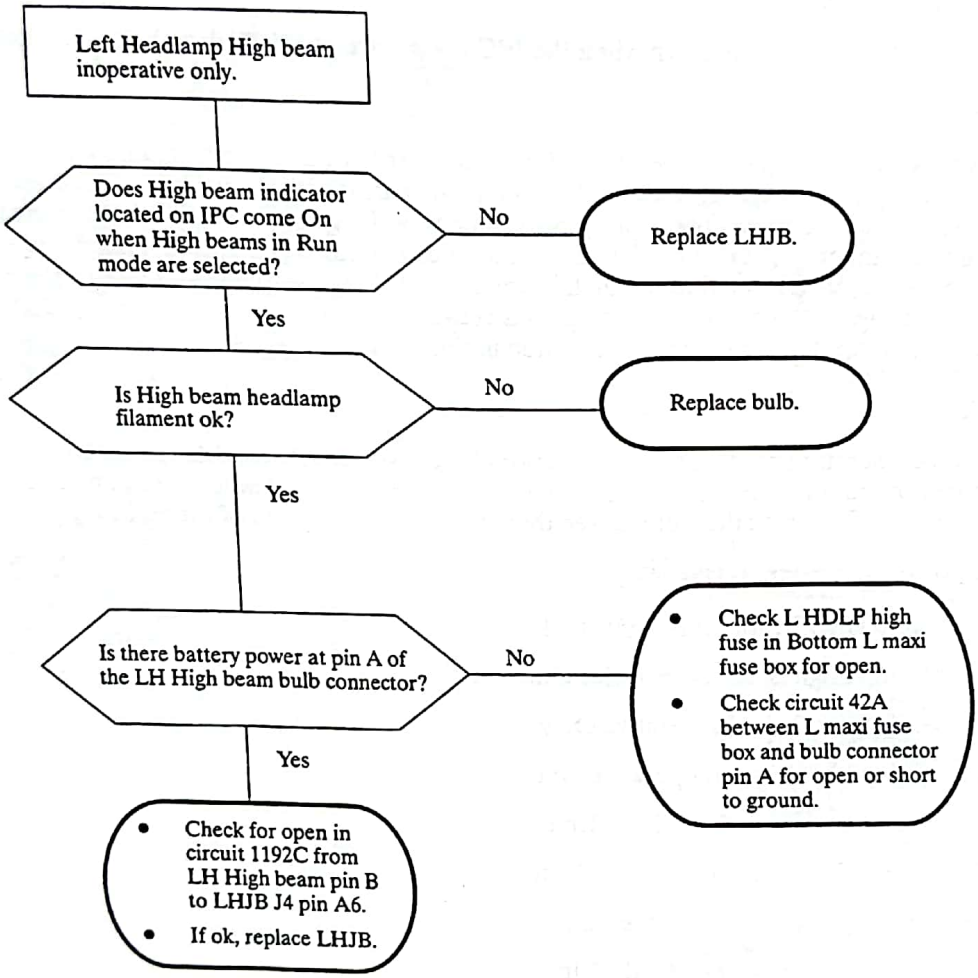
LEFT HEADLAMP HIGH BEAM INOPERATIVE ONLY

CHART 1



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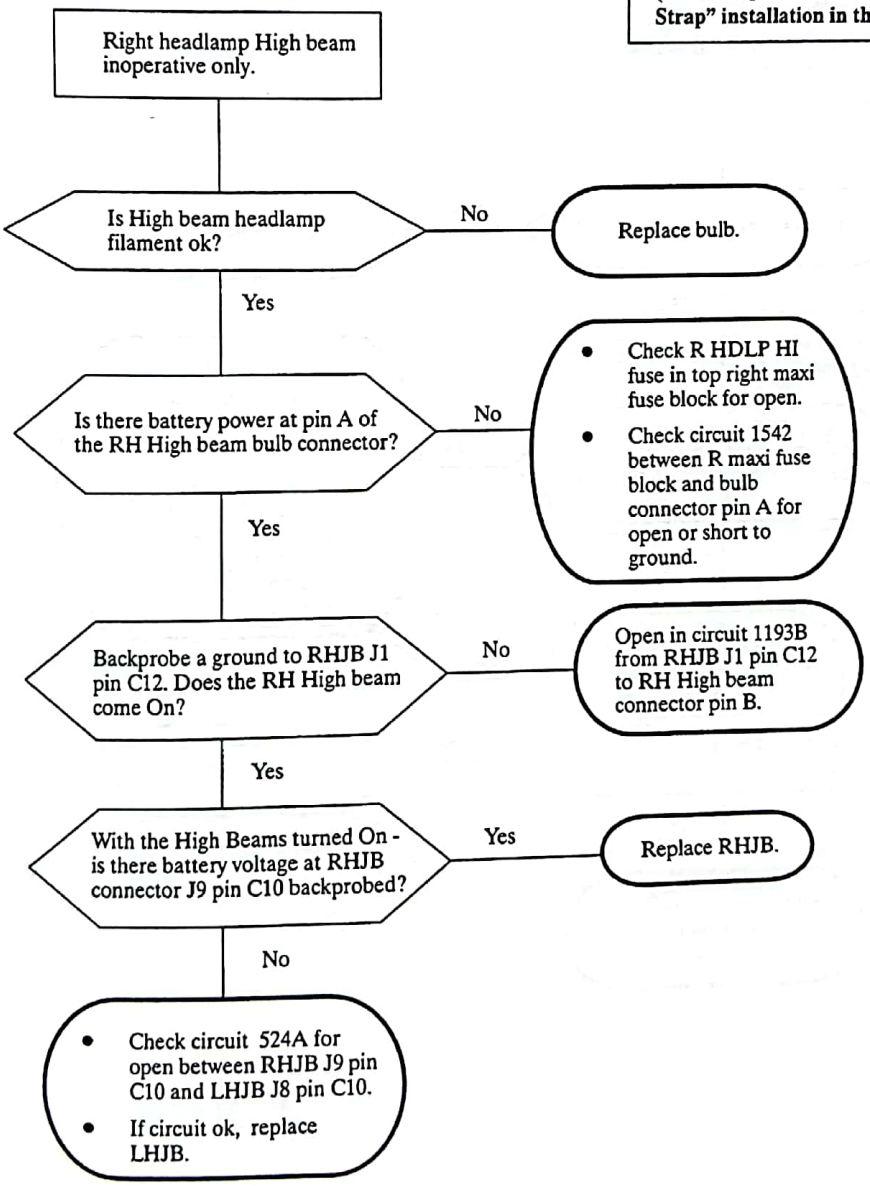
RIGHT HEADLAMP HIGH BEAM INOPERATIVE ONLY

CHART 2

IMPORTANT Make sure to perform System Check before going through this trouble tree.

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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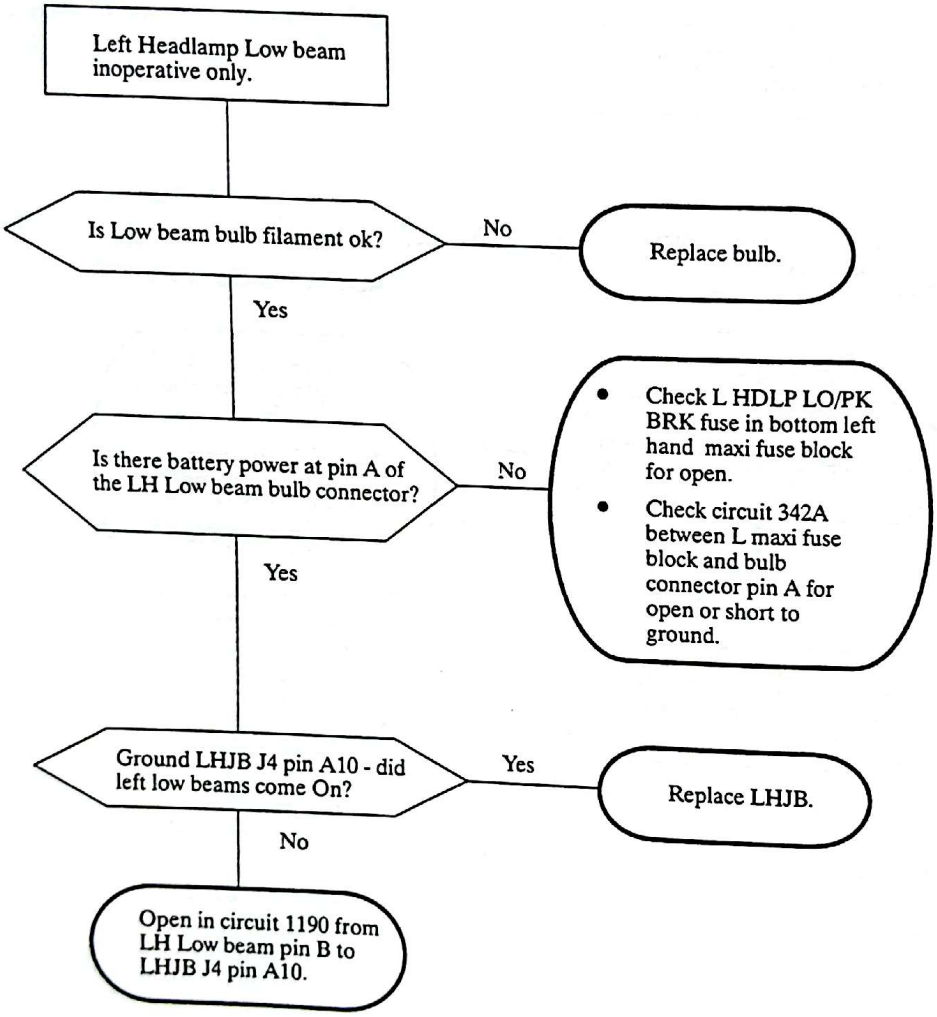
LEFT HEADLAMP LOW BEAM INOPERATIVE ONLY

CHART 3



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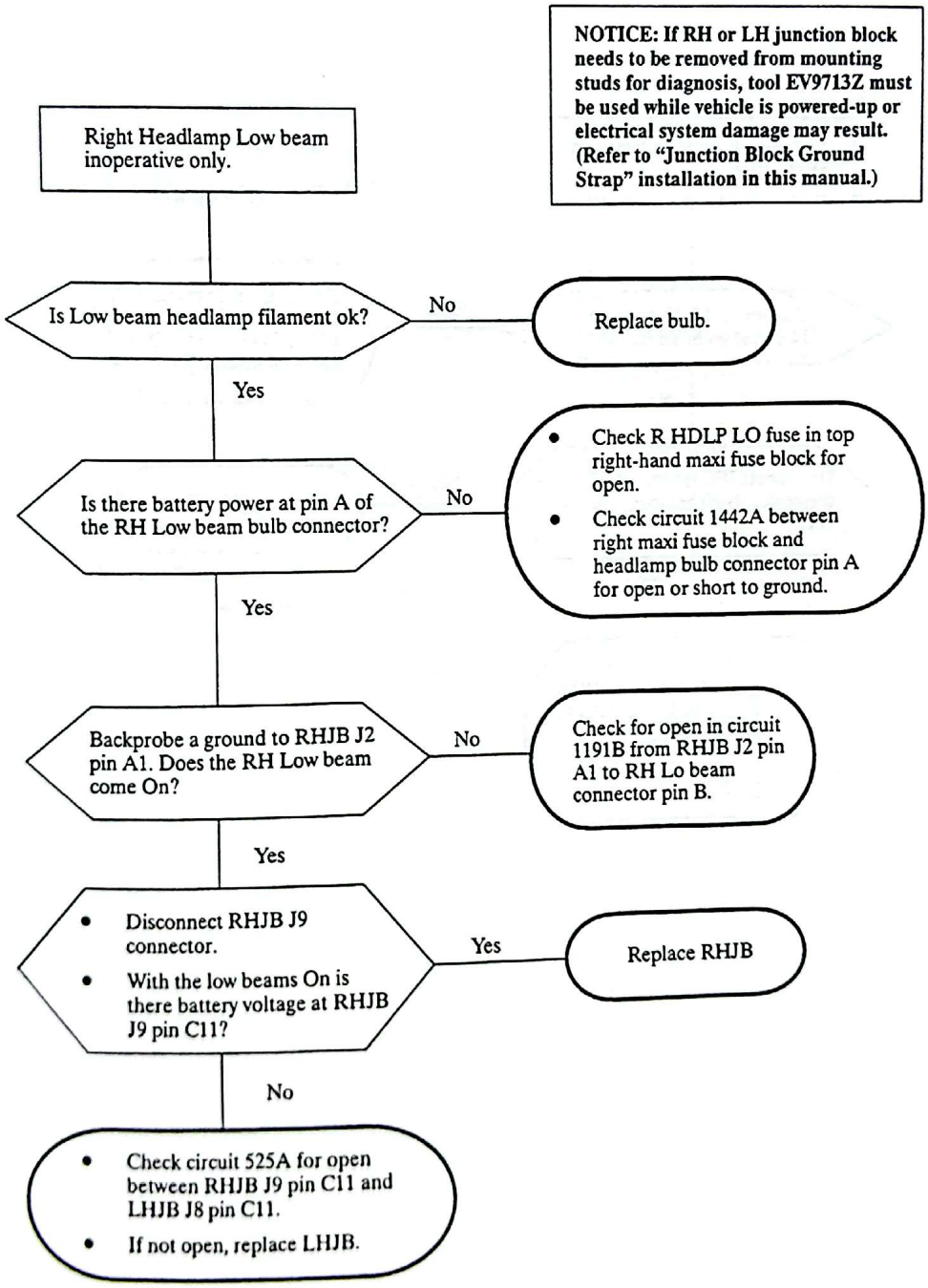
RIGHT HEADLAMP LOW BEAM INOPERATIVE ONLY

CHART 4



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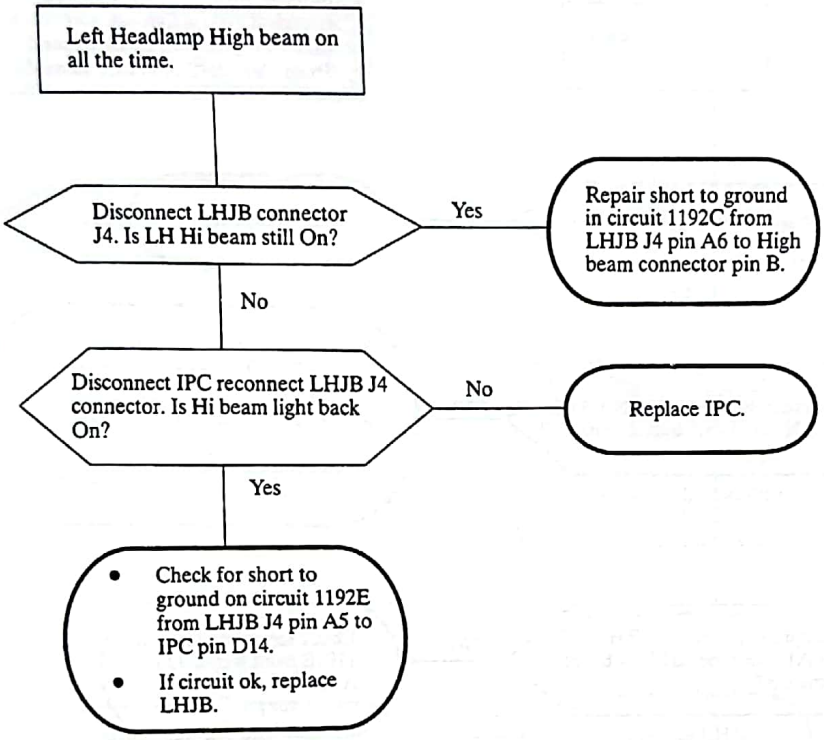
LEFT HEADLAMP HIGH BEAM ON ALL THE TIME

CHART 5



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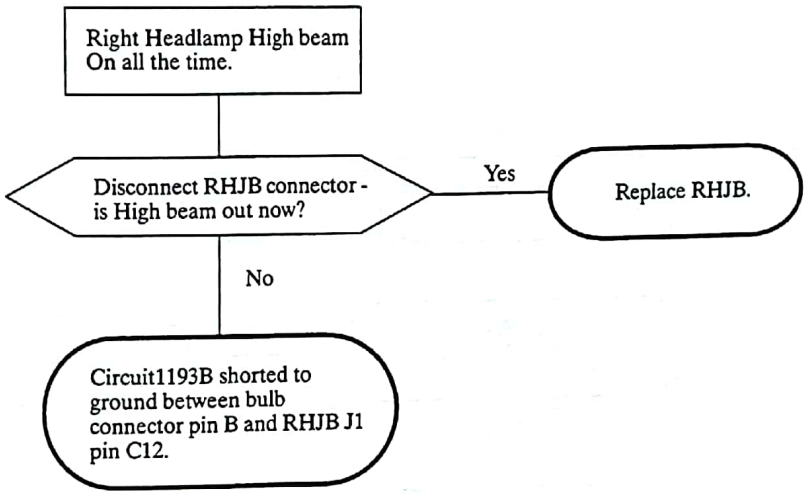
RIGHT HEADLAMP HIGH BEAM ON ALL THE TIME

CHART 6



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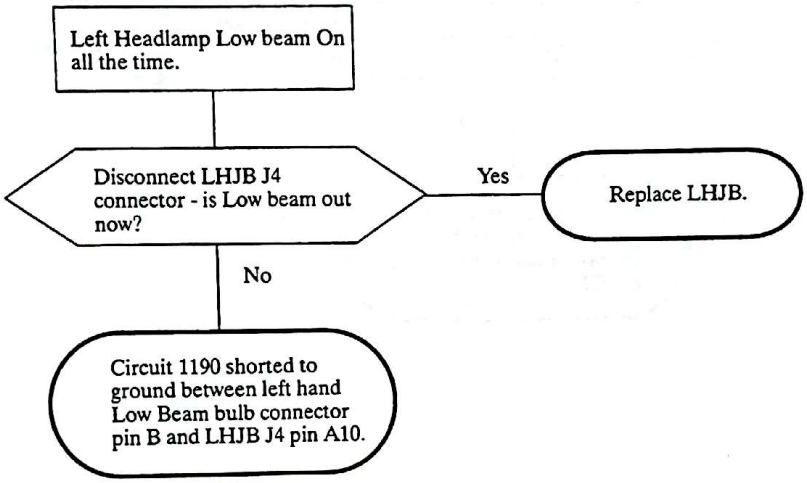
LEFT HEADLAMP LOW BEAM ON ALL THE TIME

CHART 7



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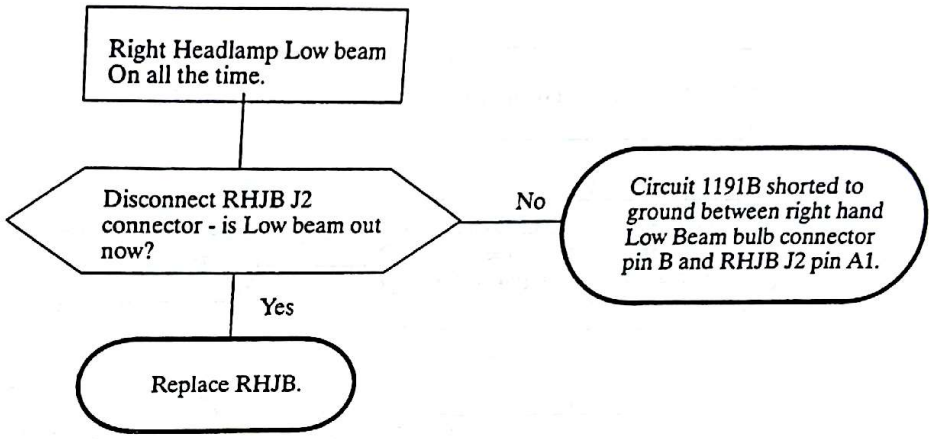
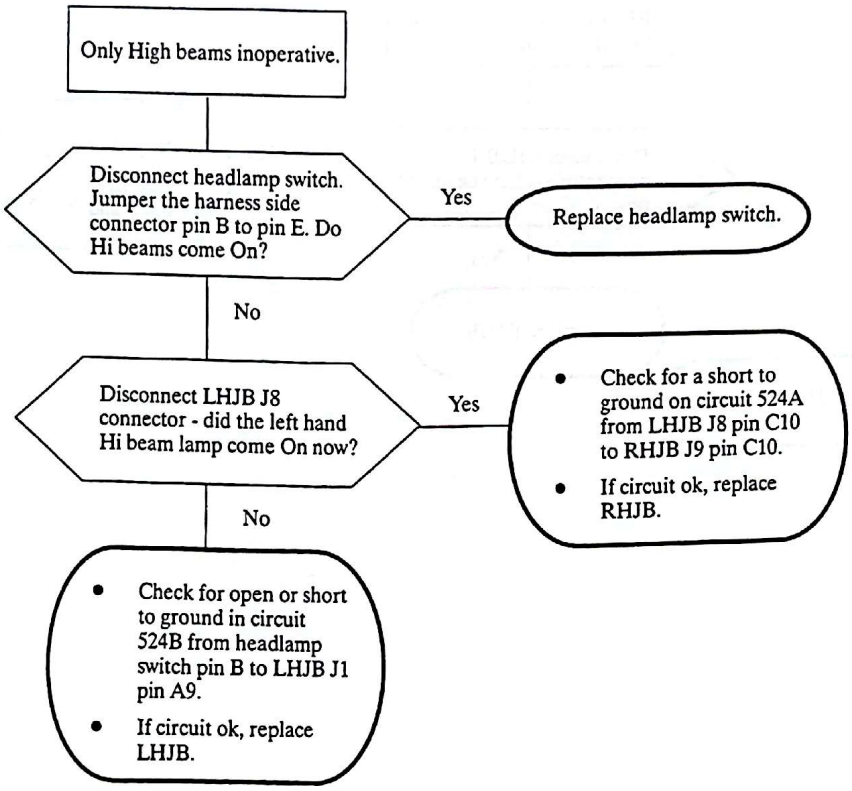
RIGHT HEADLAMP LOW BEAM ON ALL THE TIME

CHART 8



ONLY HIGH BEAMS INOPERATIVE

CHART 9



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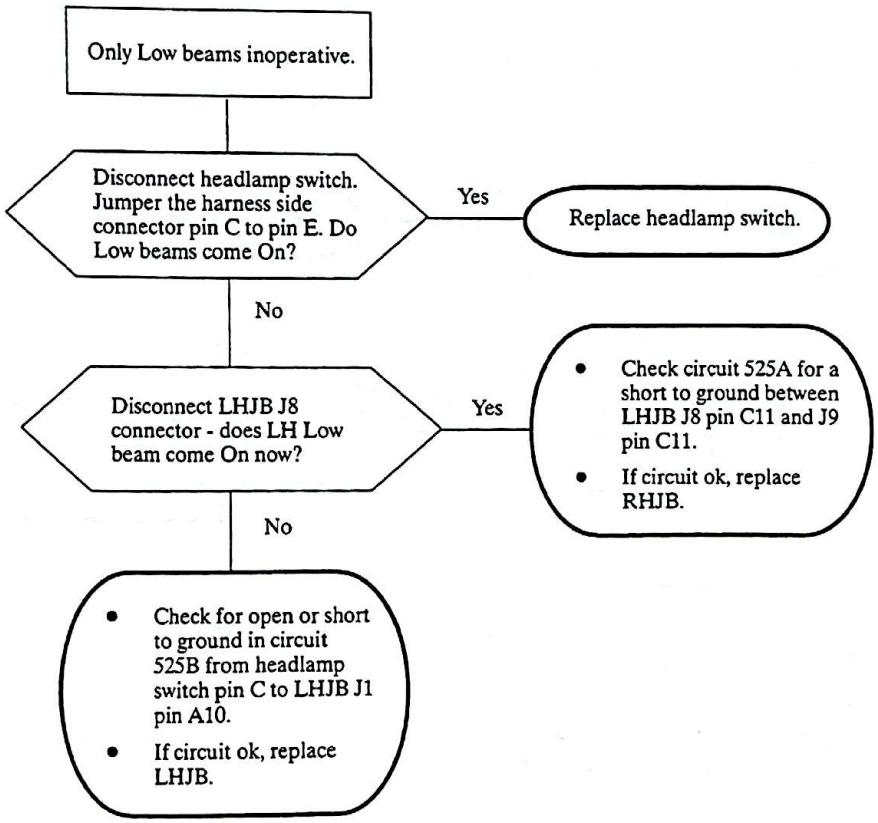
ONLY LOW BEAMS INOPERATIVE

CHART 10



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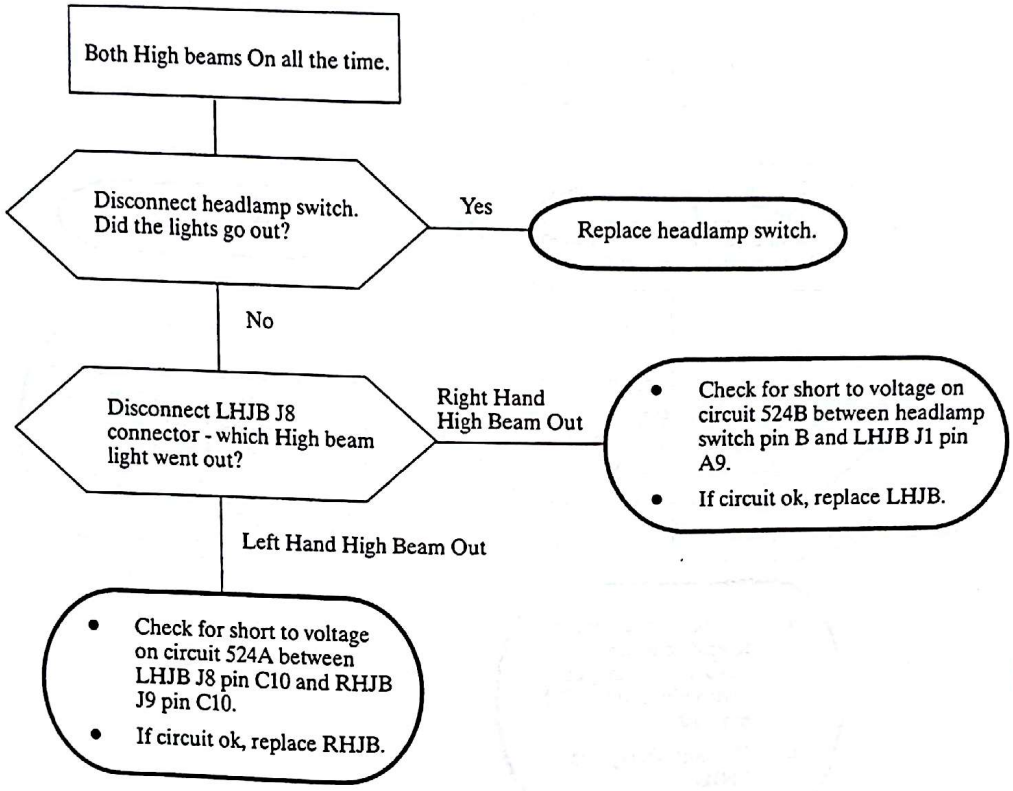
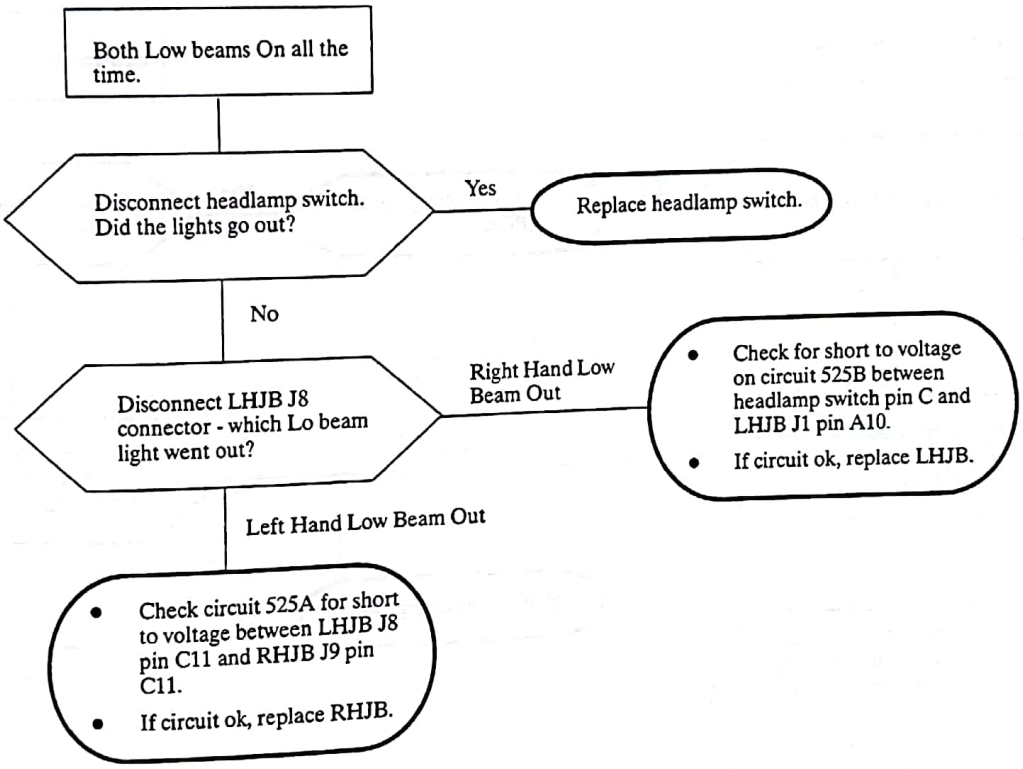
BOTH HIGH BEAMS ON ALL THE TIME

CHART 11



BOTH LOW BEAMS ON ALL THE TIME

CHART 12



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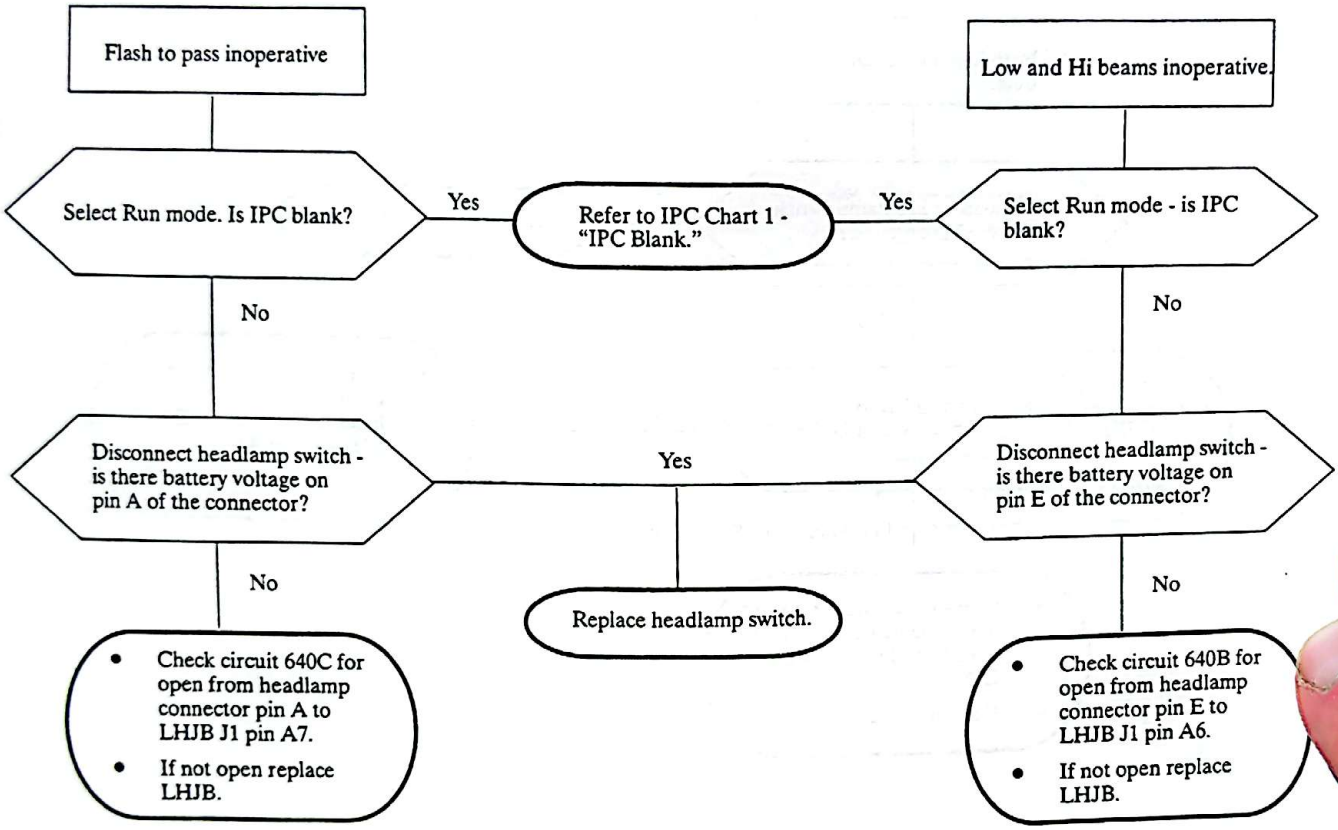
FLASH TO PASS INOPERATIVE/LO AND HIGH BEAMS INOPERATIVE

CHART 13



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NOTES

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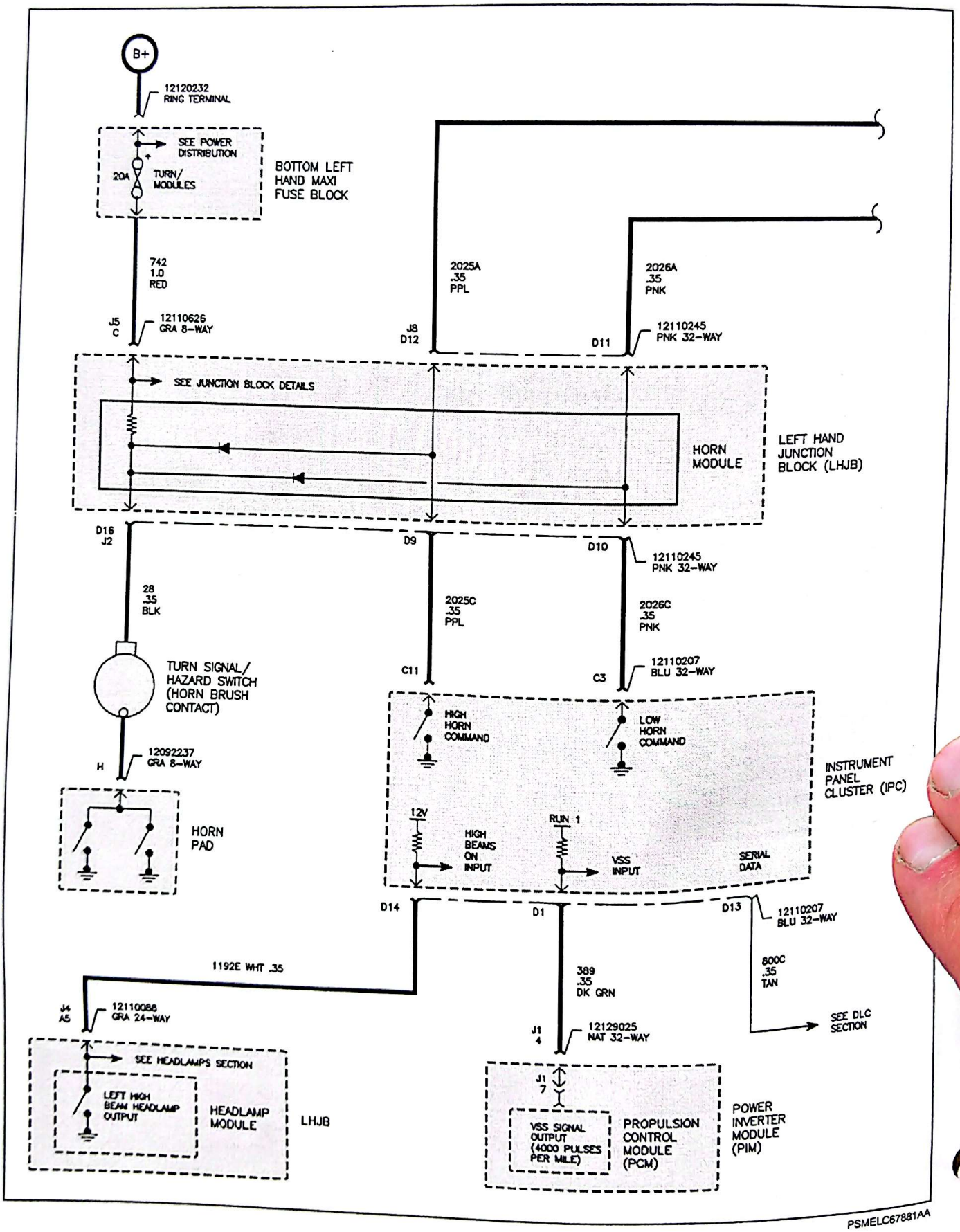
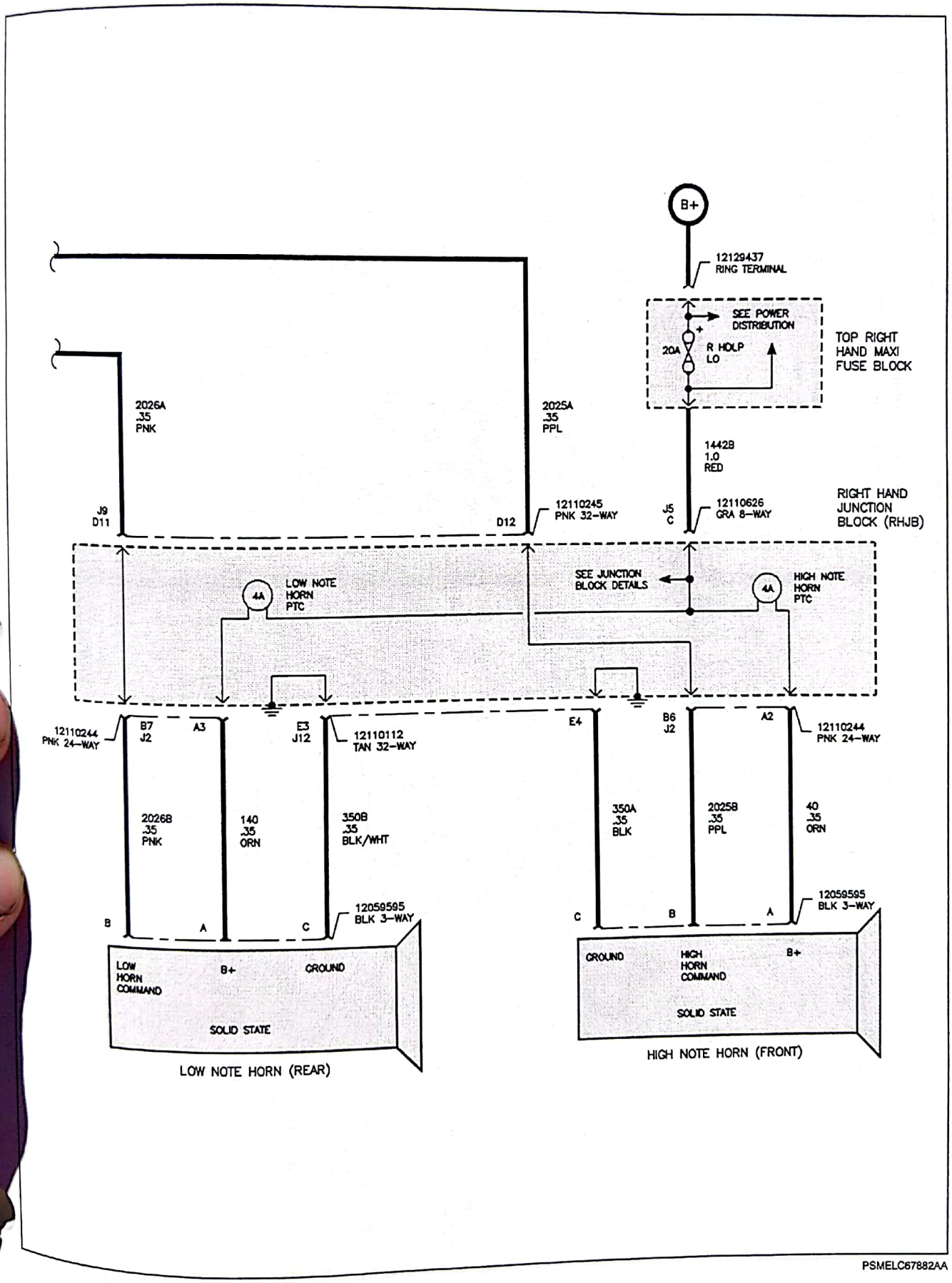
HORNS


B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION
20A
TURN/ MODULES
BOTTOM LEFT HAND MAXI FUSE BLOCK
742
1.0
RED
J5
C
12110626
GRA 8-WAY
2025A
.35
PPL
J8
D12
2026A
.35
PNK
D11
12110245
PNK 32-WAY
SEE JUNCTION BLOCK DETAILS
HORN MODULE
LEFT HAND JUNCTION BLOCK (LHJB)
D16
J2
D9
D10
12110245
PNK 32-WAY
28
.35
BLK
2025C
.35
PPL
2026C
.35
PNK
C11
C3
12110207
BLU 32-WAY
TURN SIGNAL/ HAZARD SWITCH (HORN BRUSH CONTACT)
H
12092237
GRA 8-WAY
HIGH HORN COMMAND
LOW HORN COMMAND
INSTRUMENT PANEL CLUSTER (IPC)
12V
HIGH BEAMS ON INPUT
RUN 1
VSS INPUT
SERIAL DATA
HORN PAD
D14
D1
D13
12110207
BLU 32-WAY
1192E WHT .35
389
.35
DK GRN
800C
.35
TAN
SEE DLC SECTION
J4
A5
12110088
GRA 24-WAY
J1
4
12129025
NAT 32-WAY
SEE HEADLAMPS SECTION
LEFT HIGH BEAM HEADLAMP OUTPUT
HEADLAMP MODULE
LHJB
J1
7
VSS SIGNAL OUTPUT (4000 PULSES PER MILE)
PROPULSION CONTROL MODULE (PCM)
POWER INVERTER MODULE (PIM)
PSMELC67881AA



PSMELC67882AA

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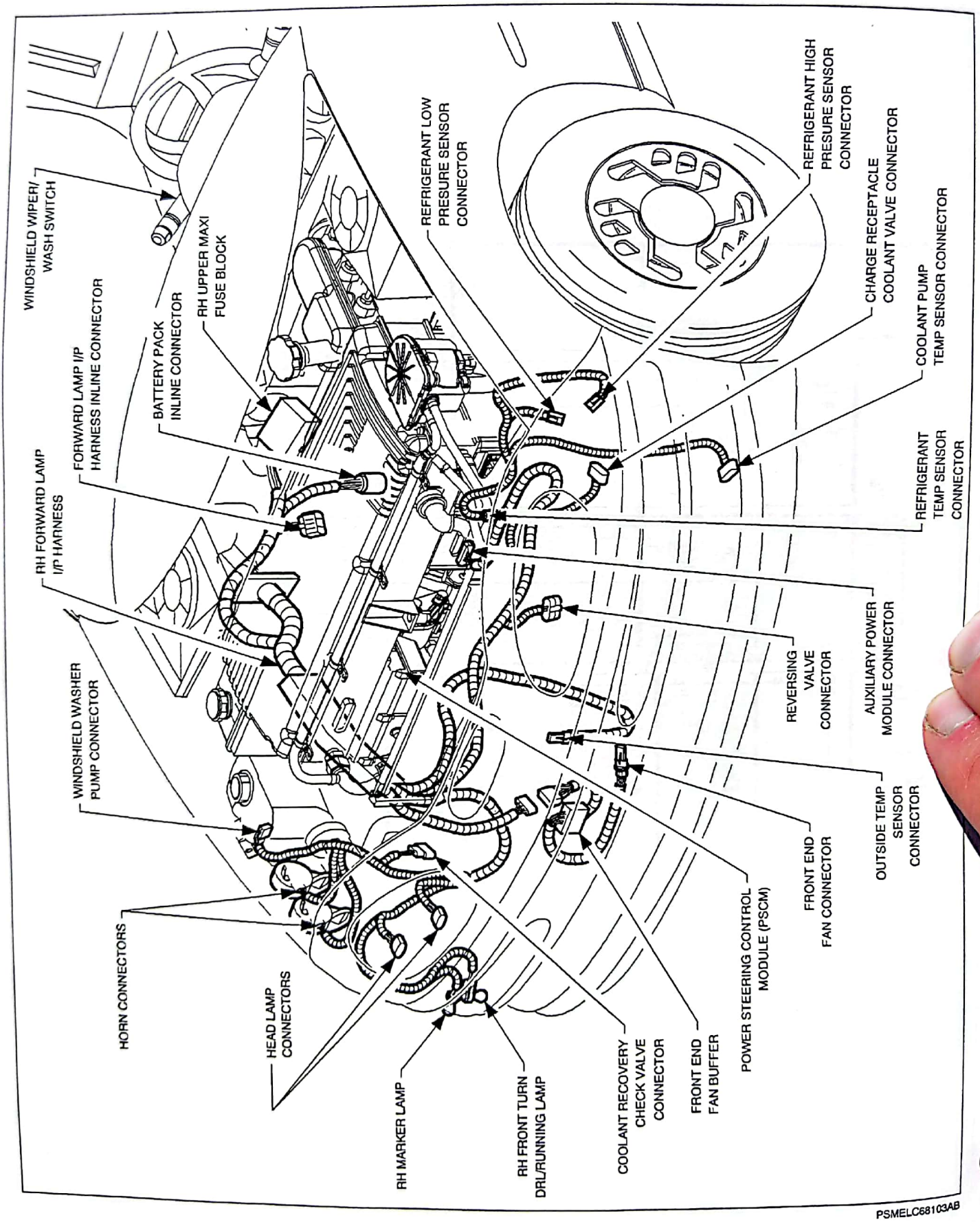
HORNS COMPONENT LOCATION VIEW



HORNS

The EV1 has two electronic horns, a 400 Hz (lo note) and a 500 Hz (hi note). Each horn has its own dedicated power and ground. Each horn turns On when it receives a ground on its input line. The lines to both horns are grounded whenever the horn pad is pressed.

PEDESTRIAN ALERT MODE

The pedestrian alert allows the driver to politely warn pedestrians they are in the path of a vehicle that is moving or may soon move. The same switch action is used as "flash to pass." If the turn signal switch is pulled rearward at speeds of 25 mph or below, the Hi beams come on and the pedestrian alert is sounded. The IPC receives the Hi beam signal and if the speed is correct, sends a brief set of ground pulses to the horn inputs (total signal less than 1/4 of a second). The brief "chirp" that results is milder than a normal horn sound.

REVERSE WARNING

When the vehicle is shifted into reverse, the IPC sounds the horns in a special pattern to alert pedestrians behind the vehicle that the vehicle is backing up or may soon back up. The horns are pulsed on for 0.007 seconds alternating between the low and high note horns. Each horn is pulsed 36 times a minute. This warning is at a lower volume than normal horn operation, yet very apparent to pedestrians.

HORN TROUBLE TREE INDEX

- Chart 1 – Horns Inoperative
- Chart 2 – Pedestrian Alert Mode Only Inoperative
- Chart 3 – Reverse Warning Mode Only Inoperative
- Chart 4 – Horns On All the Time (One or Both)

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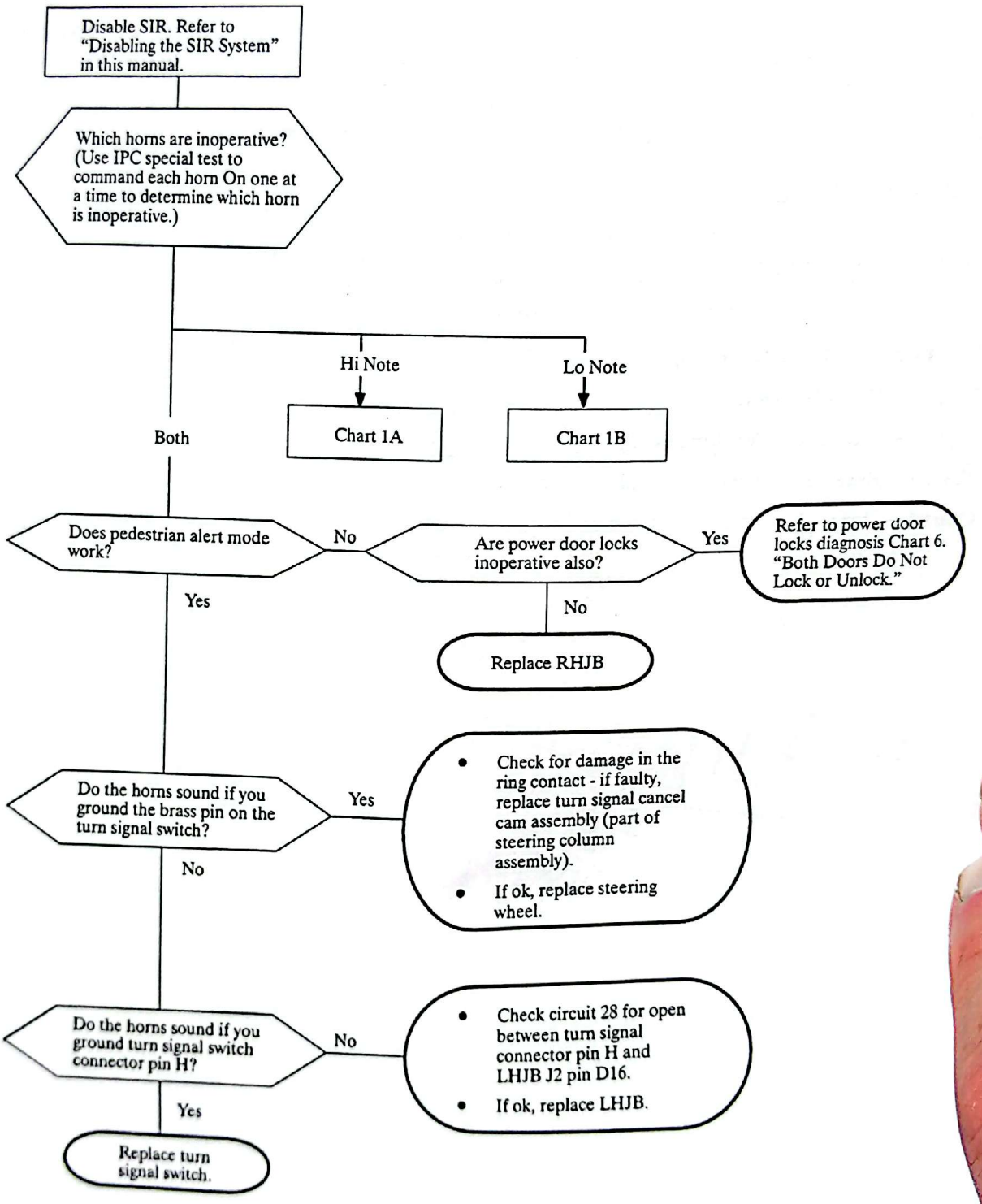
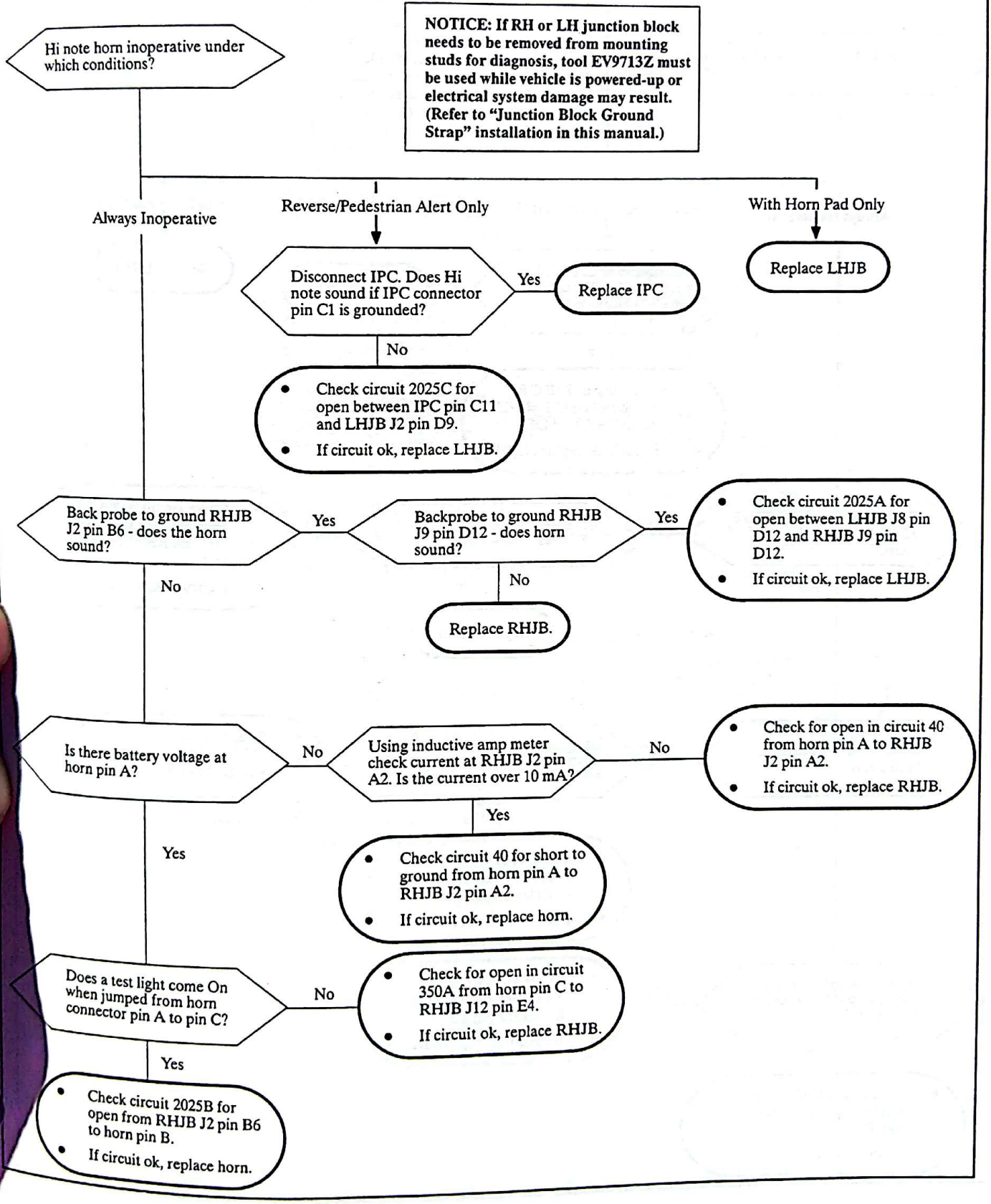
HORNS INOPERATIVE – CHART 1



HORNS INOPERATIVE – CHART 1A



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HORNS INOPERATIVE – CHART 1B

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Lo note horn inoperative under which conditions?

- Always Inoperative
- Reverse/Pedestrian Alert Only
- With Horn Pad Only

With Horn Pad Only → Replace LHJB.

Reverse/Pedestrian Alert Only → Disconnect IPC. Does Lo note sound if IPC connector pin C3 is grounded?

- Yes → Replace IPC.
- No →
  - Check circuit 2026C for open between IPC pin C3 and LHJB J2 pin D10.
  - If circuit ok, replace LHJB.

Always Inoperative → Backprobe to ground RHJB J2 pin B7 - does the horn sound?

- Yes → Ground RHJB J9 pin D11 - does horn sound?
  - Yes →
    - Check circuit 2026A for open between LHJB J8 pin D11 and RHJB J9 pin D11.
    - If circuit ok, replace LHJB.
  - No → Replace RHJB.
- No → Is there battery voltage at horn pin A?
  - No → Using inductive amp meter check current at RHJB J2 pin A3. Is the current over 10 mA?
    - No →
      - Check for open in circuit 140 from horn pin A to RHJB J2 pin A3.
      - If circuit ok, replace RHJB.
    - Yes →
      - Check circuit 140 for short to ground from horn pin A to RHJB J2 pin A3.
      - If circuit ok, replace horn.
  - Yes → Does a test light come On when jumped from horn pin A to pin C?
    - No →
      - Check for open in circuit 350B from horn pin C to RHJB J12 pin E3.
      - If circuit ok, replace RHJB.
    - Yes →
      - Check circuit 2026B from RHJB J2 pin B7 to horn pin B.
      - If circuit ok, replace horn.

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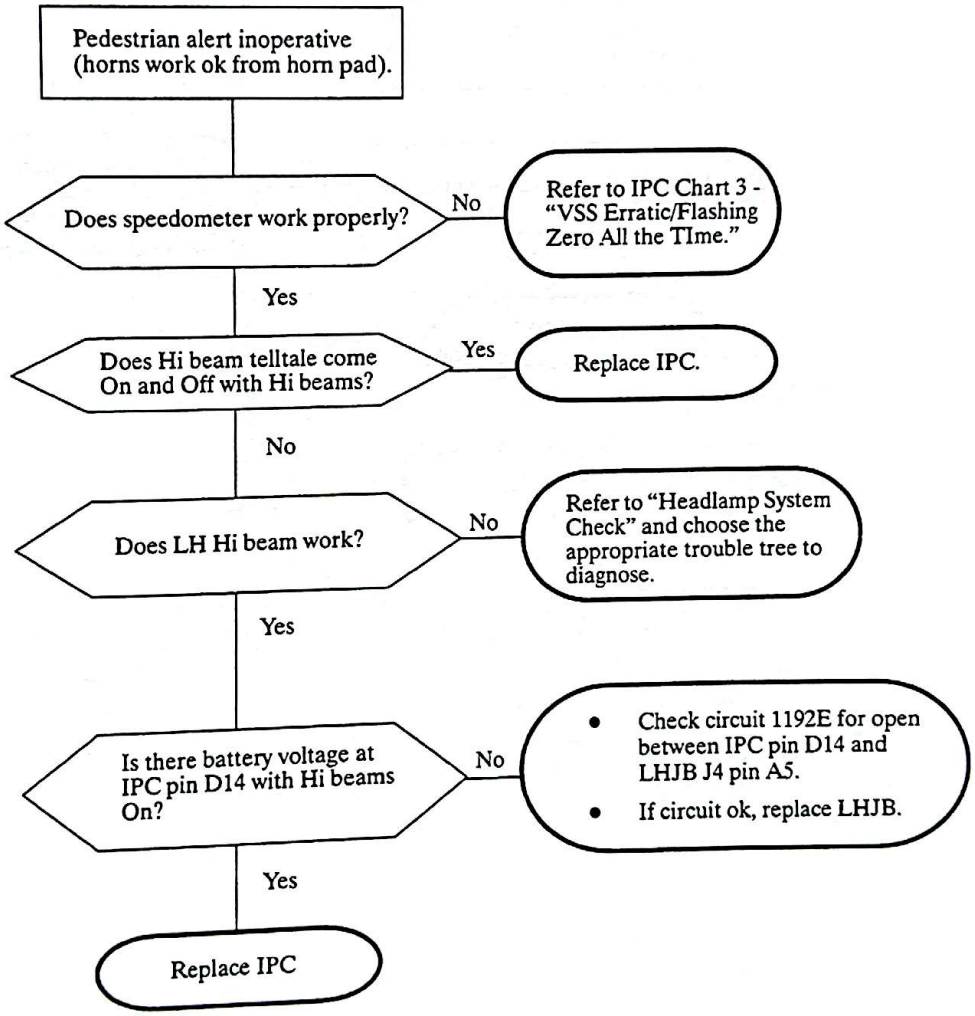
PEDESTRIAN ALERT MODE ONLY INOPERATIVE – CHART 2



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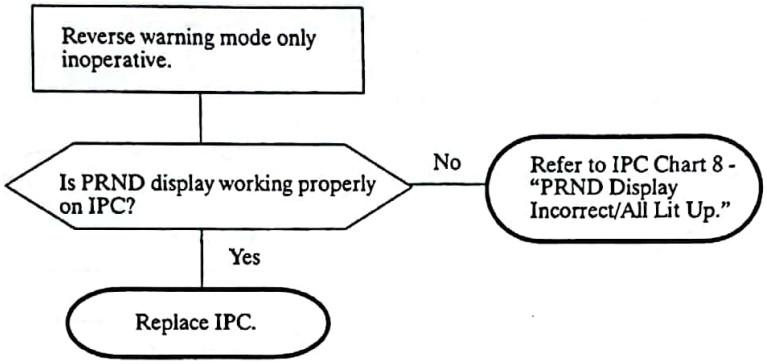
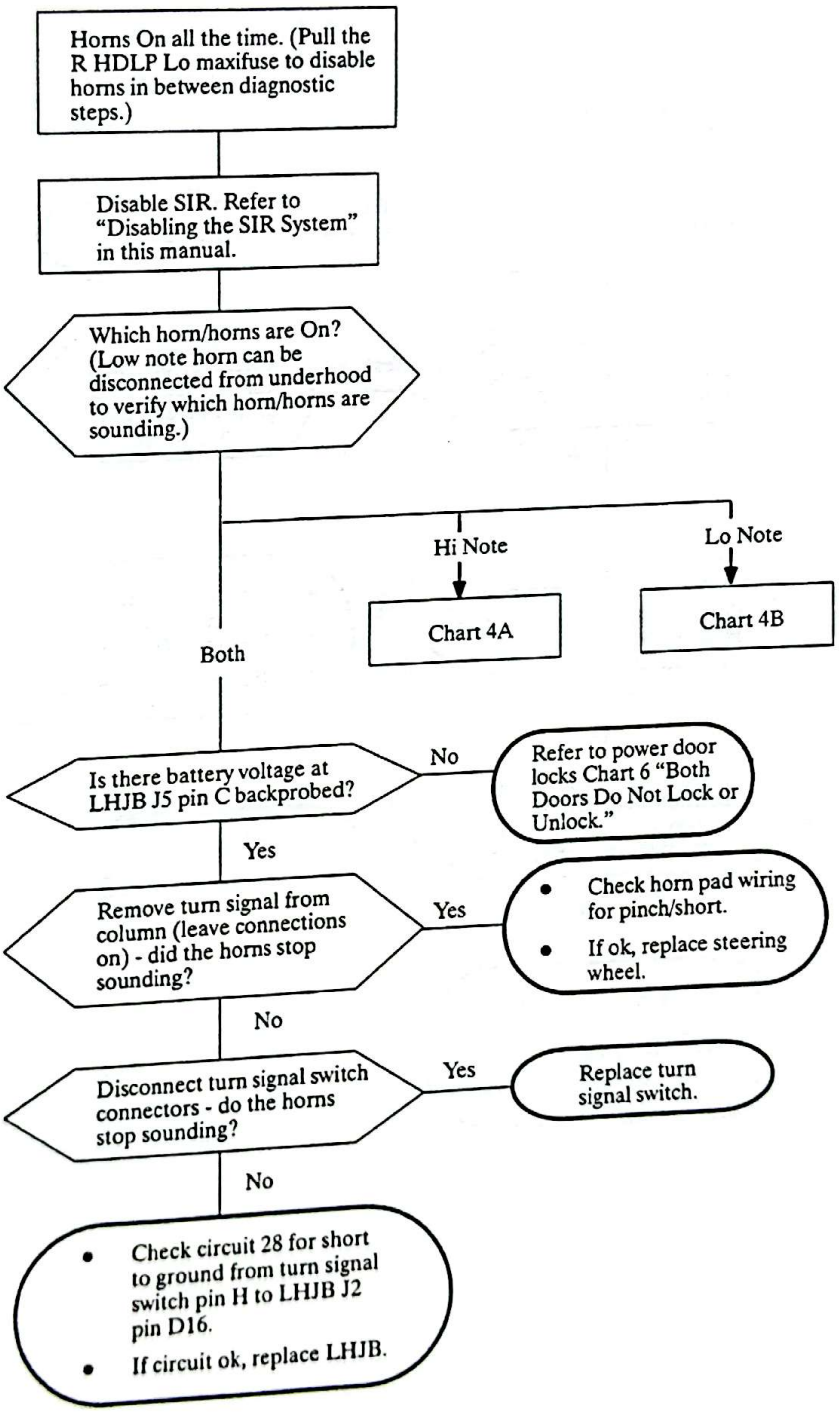
REVERSE WARNING MODE ONLY INOPERATIVE – CHART 3



HORNS ON ALL THE TIME (ONE OR BOTH) – CHART 4



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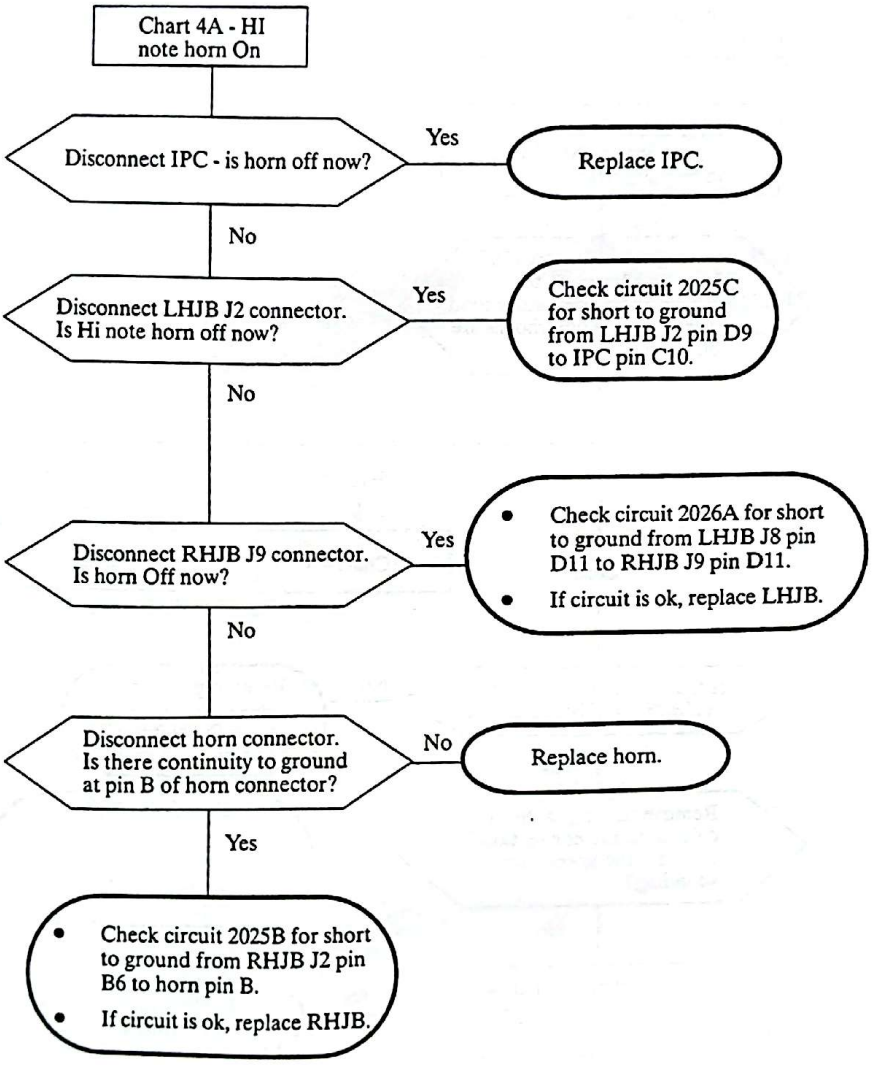
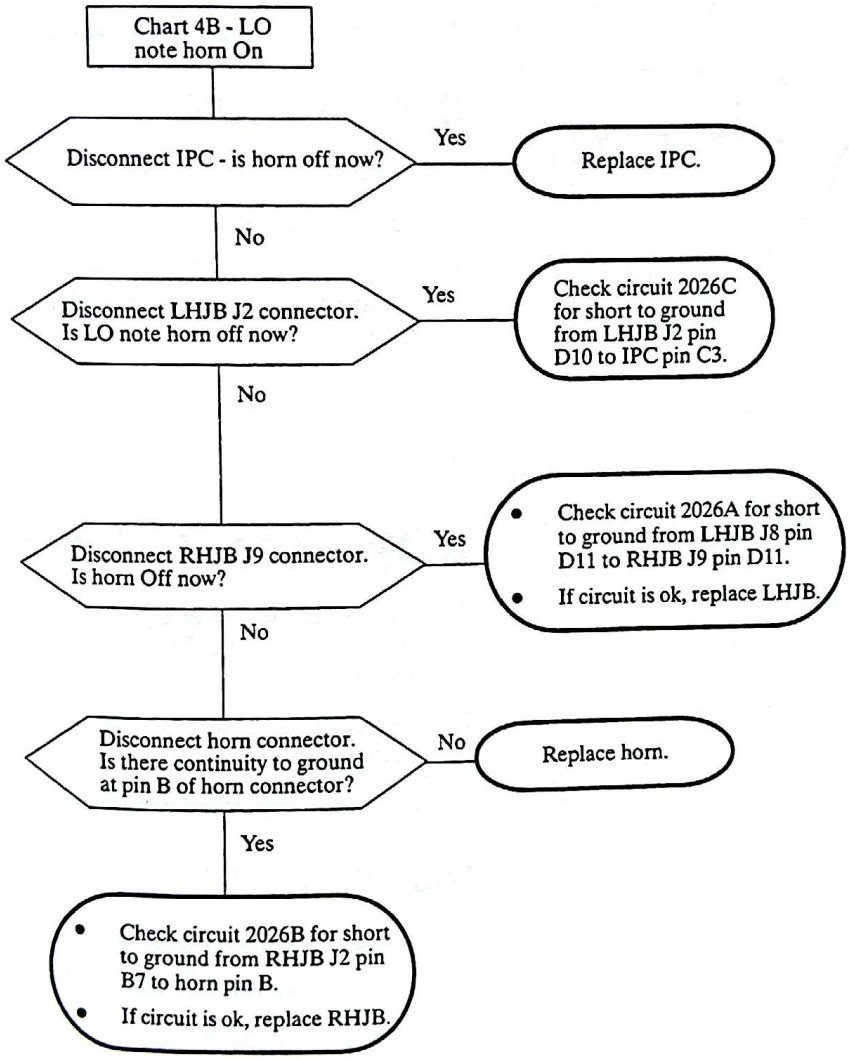
HORNS ON ALL THE TIME – CHART 4A



HORN ON ALL THE TIME – CHART 4B



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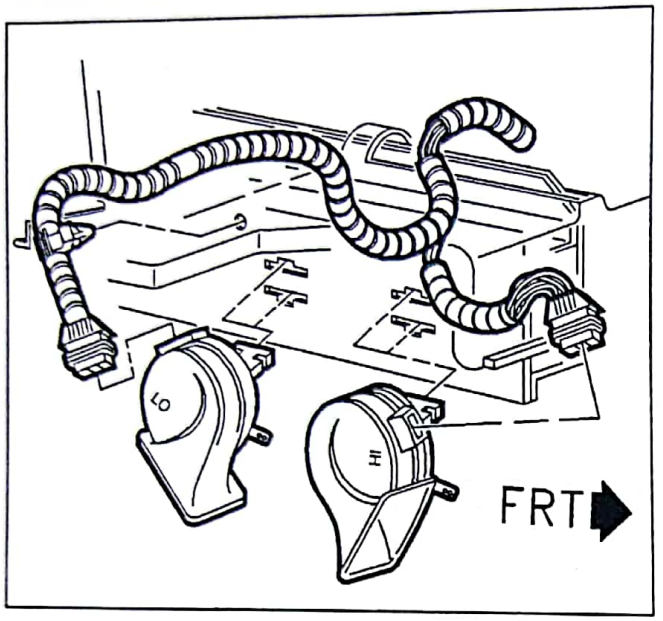

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HORN 500 HZ (HI NOTE)

REMOVAL

1. Remove front air deflector. (Refer to "Underbody Front Air Deflector" removal procedure in this manual.)
2. Squeeze horn bracket of forward horn and remove from frame.
3. Disconnect electrical connector.

INSTALLATION

1. Connect electrical connector.
2. Squeeze horn bracket and install to frame.
3. Install front air deflector. (Refer to "Underbody Front Air Deflector" installation procedure in this manual.)

HORN 400 HZ (LO NOTE)

1. Remove front air deflector. (Refer to "Underbody Front Air Deflector" removal procedure in this manual.)
2. Squeeze horn bracket of rearward horn and remove from frame.
3. Disconnect electrical connector.

INSTALLATION

1. Connect electrical connector.
2. Squeeze horn bracket and install to frame.
3. Install front air deflector. (Refer to "Underbody Front Air Deflector" installation procedure in this manual.)

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NOTES

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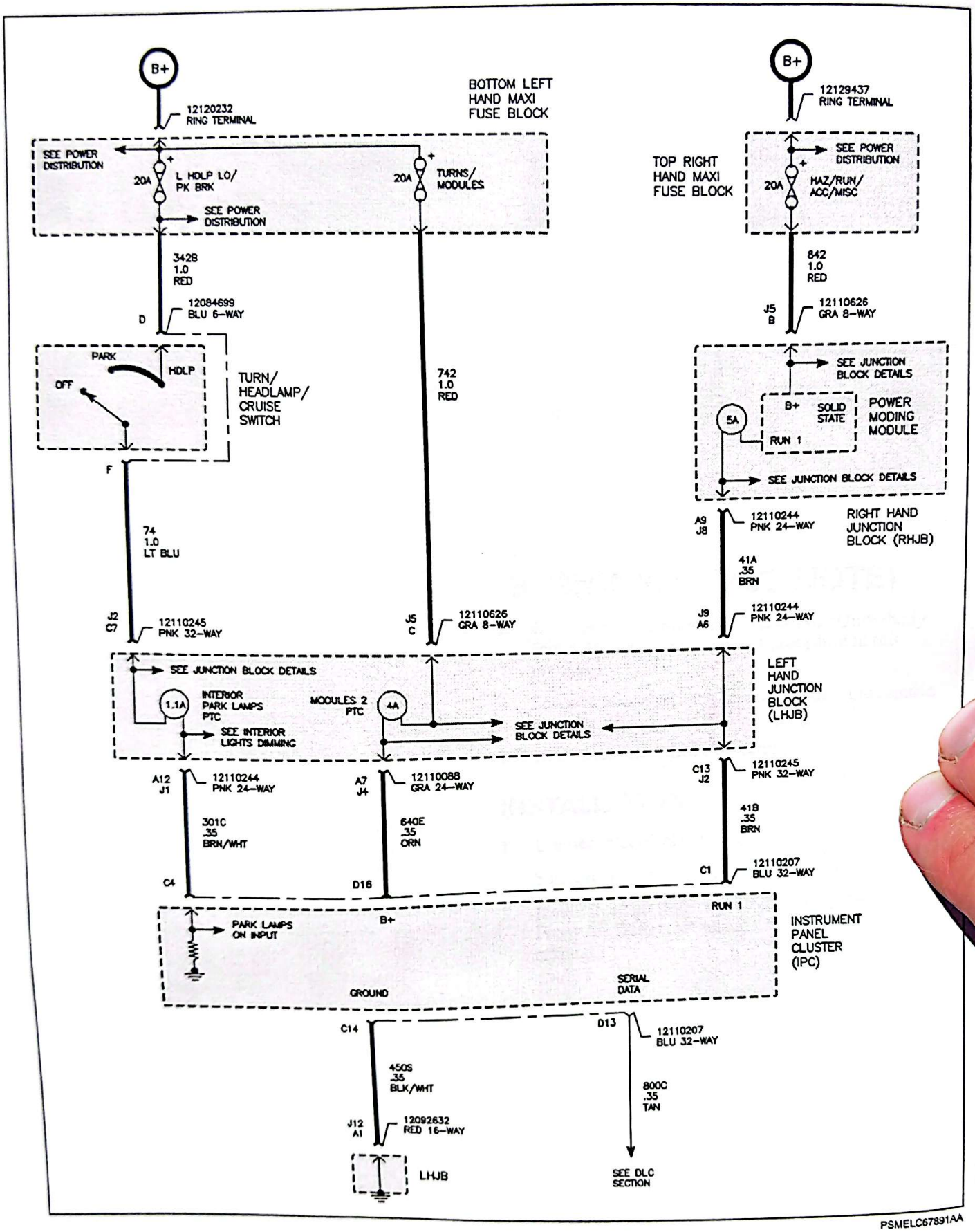
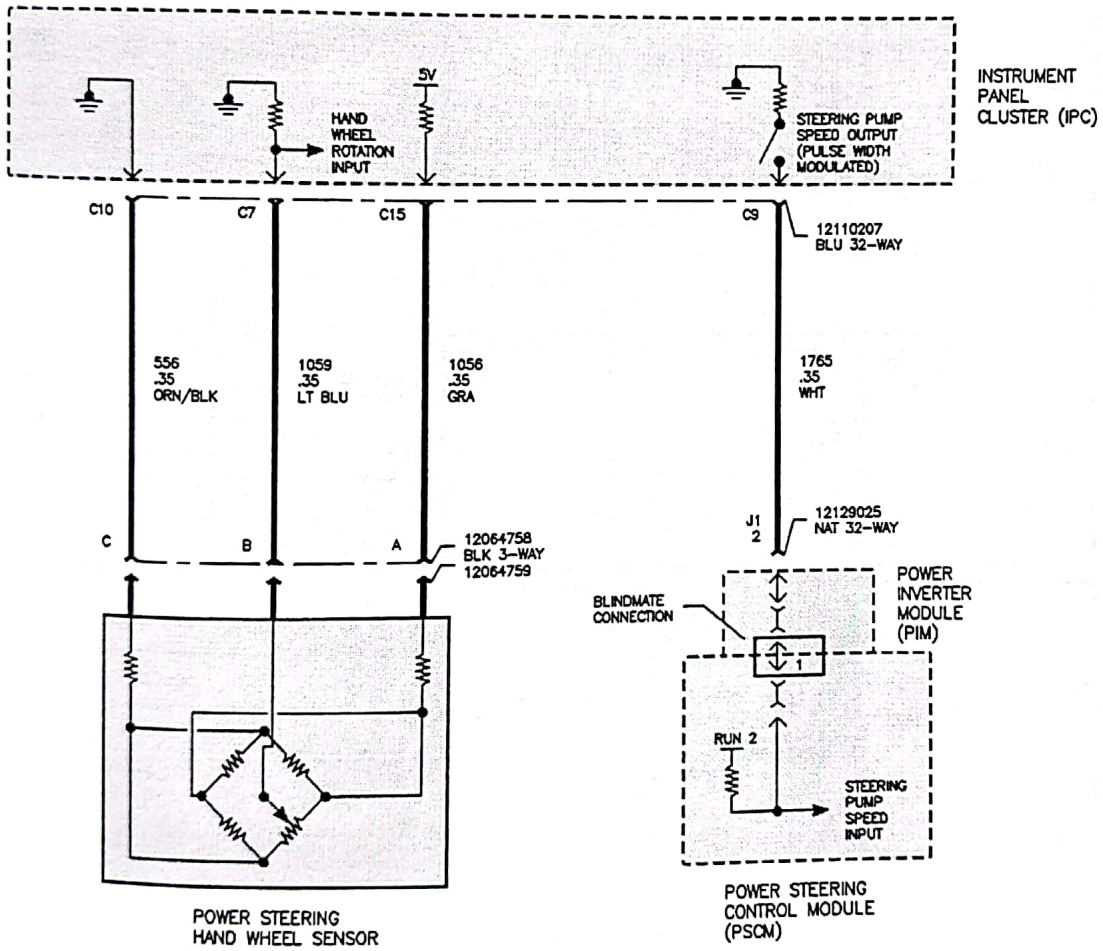
INSTRUMENT PANEL CLUSTER





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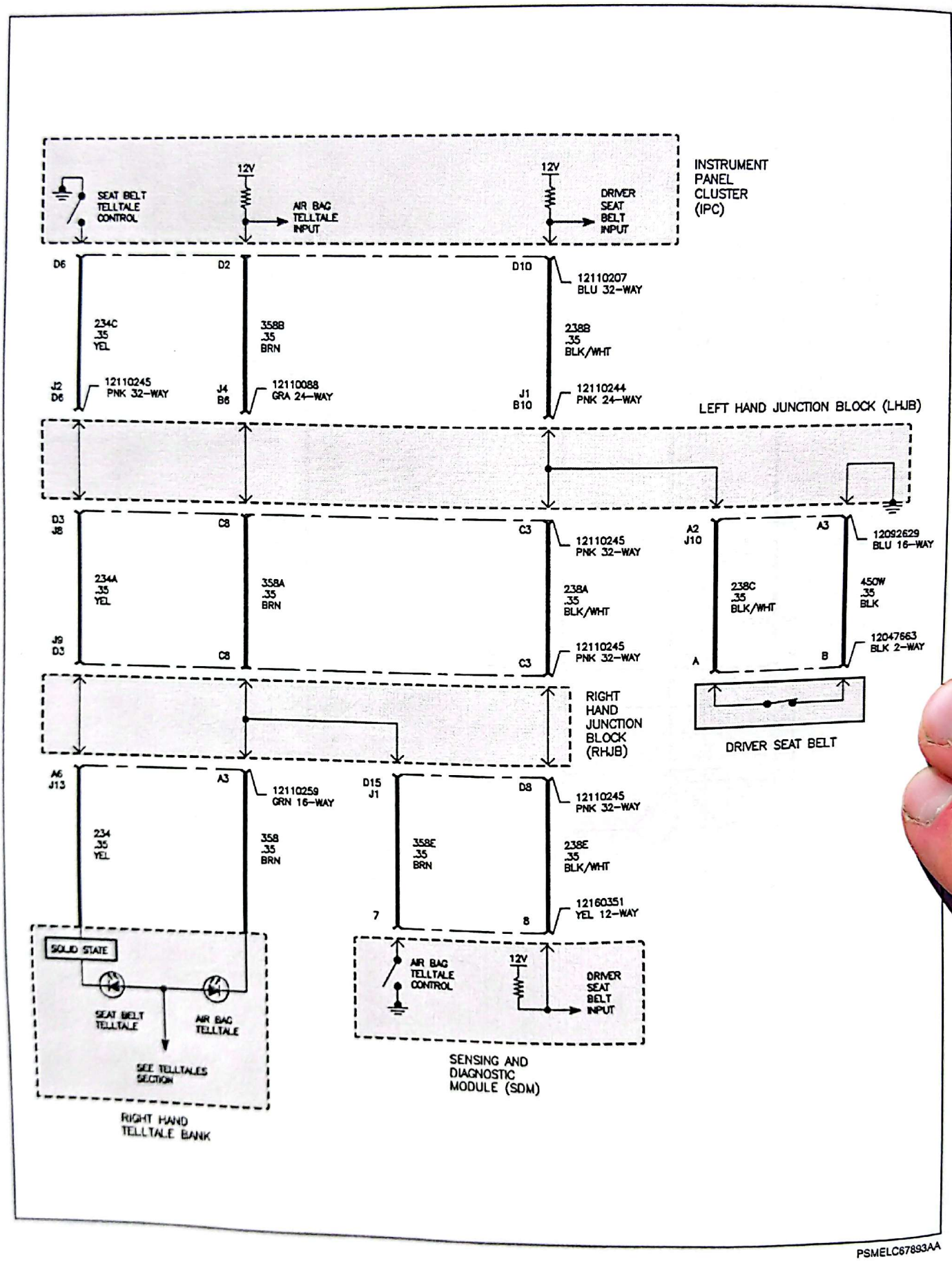

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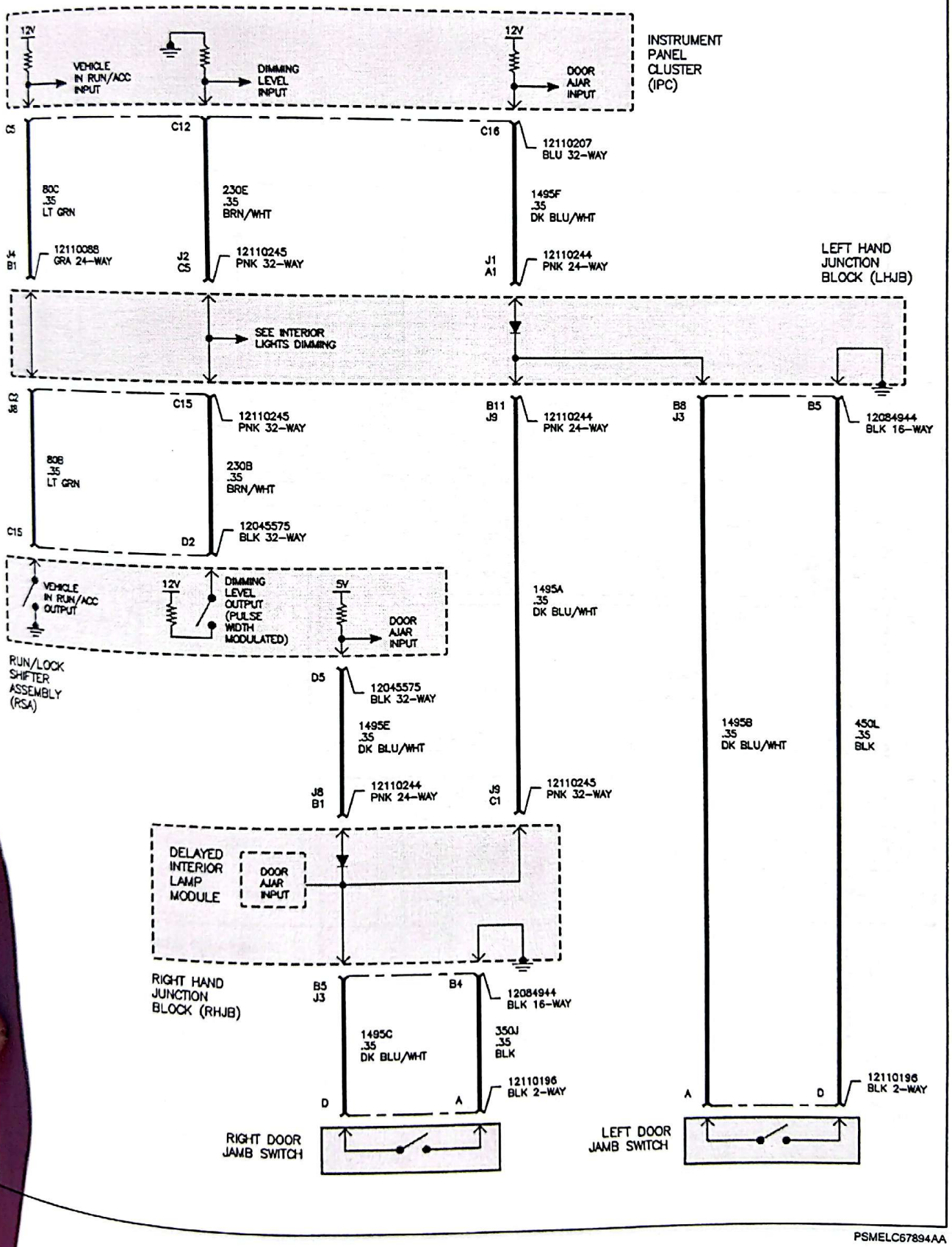
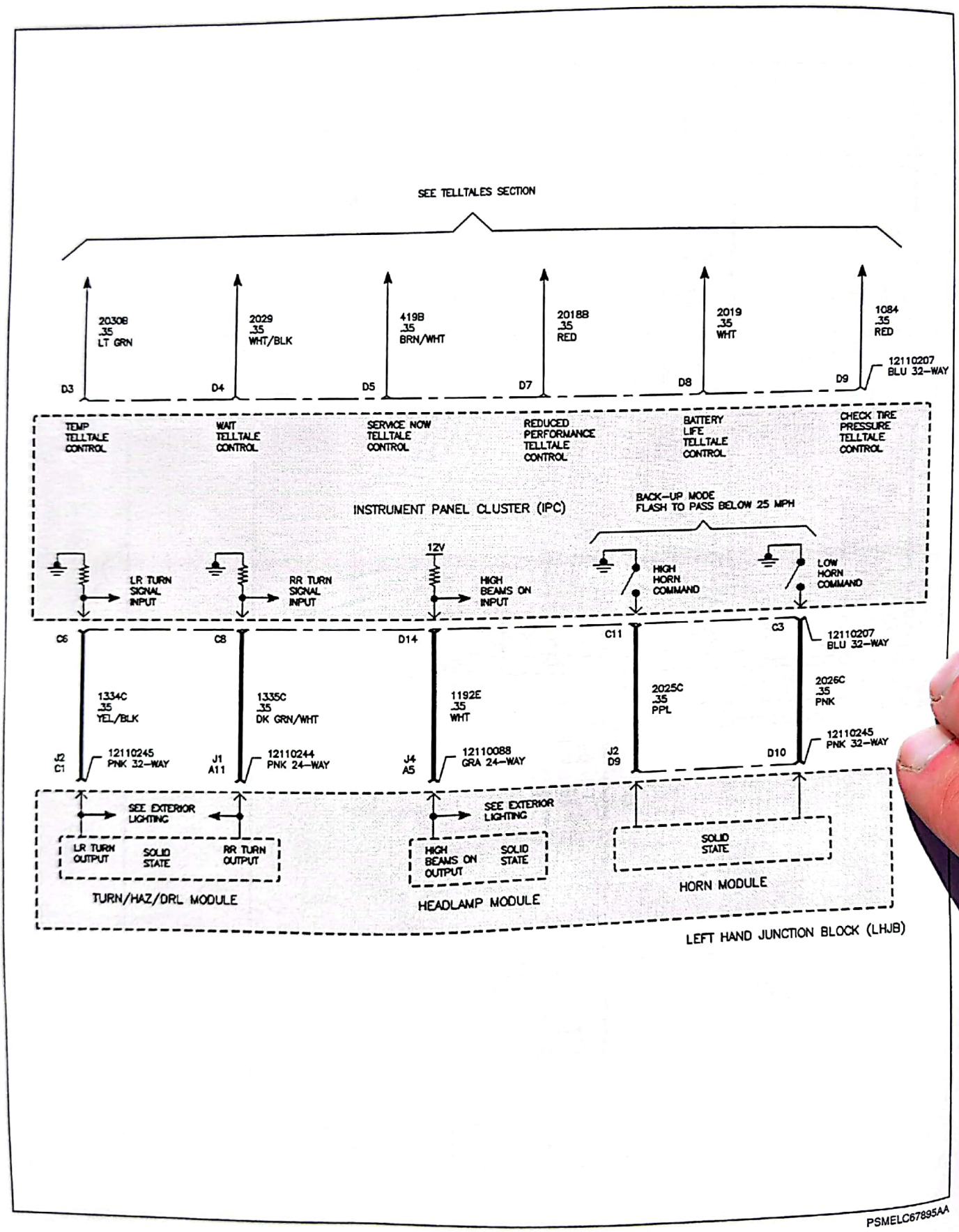
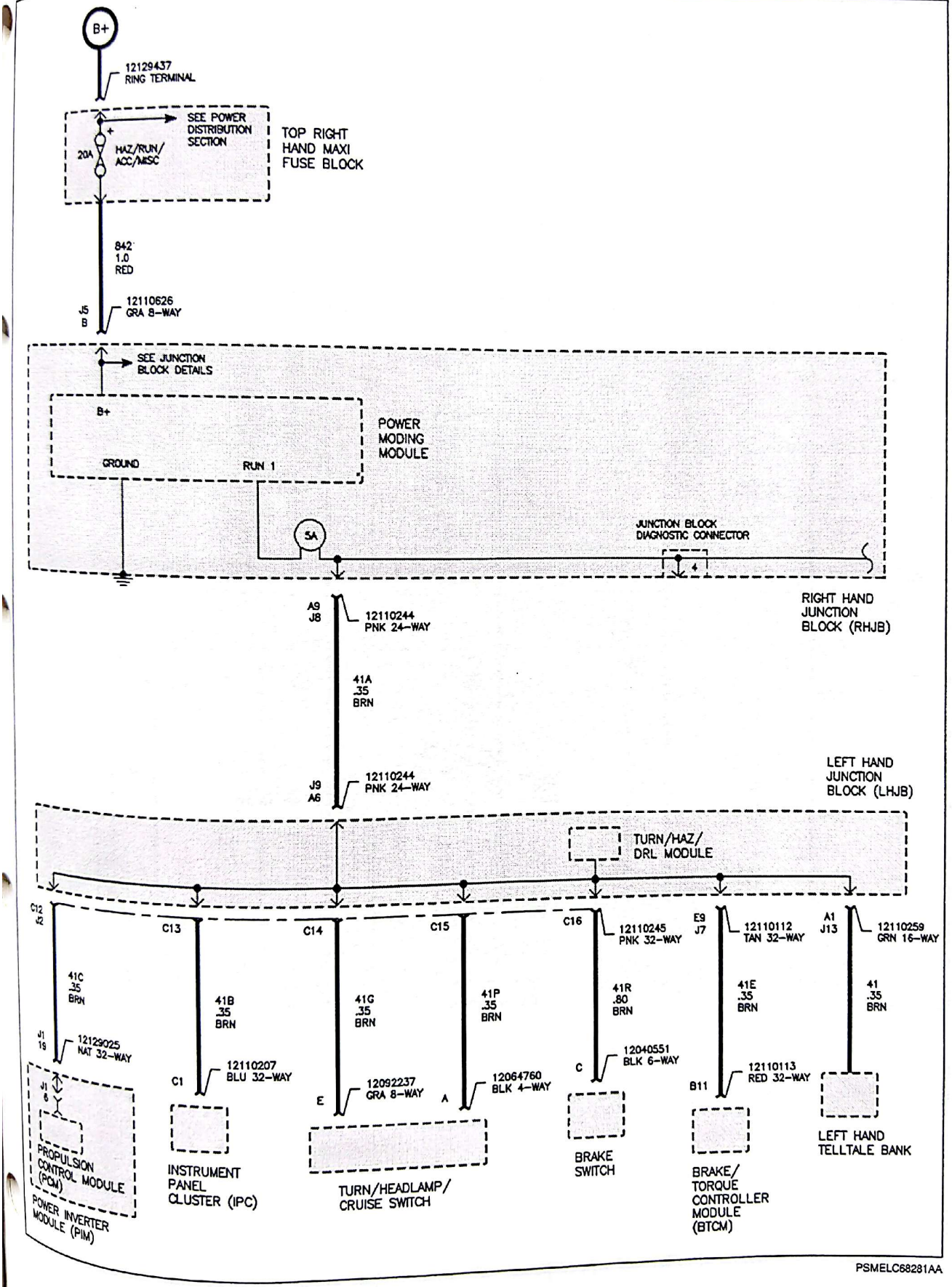
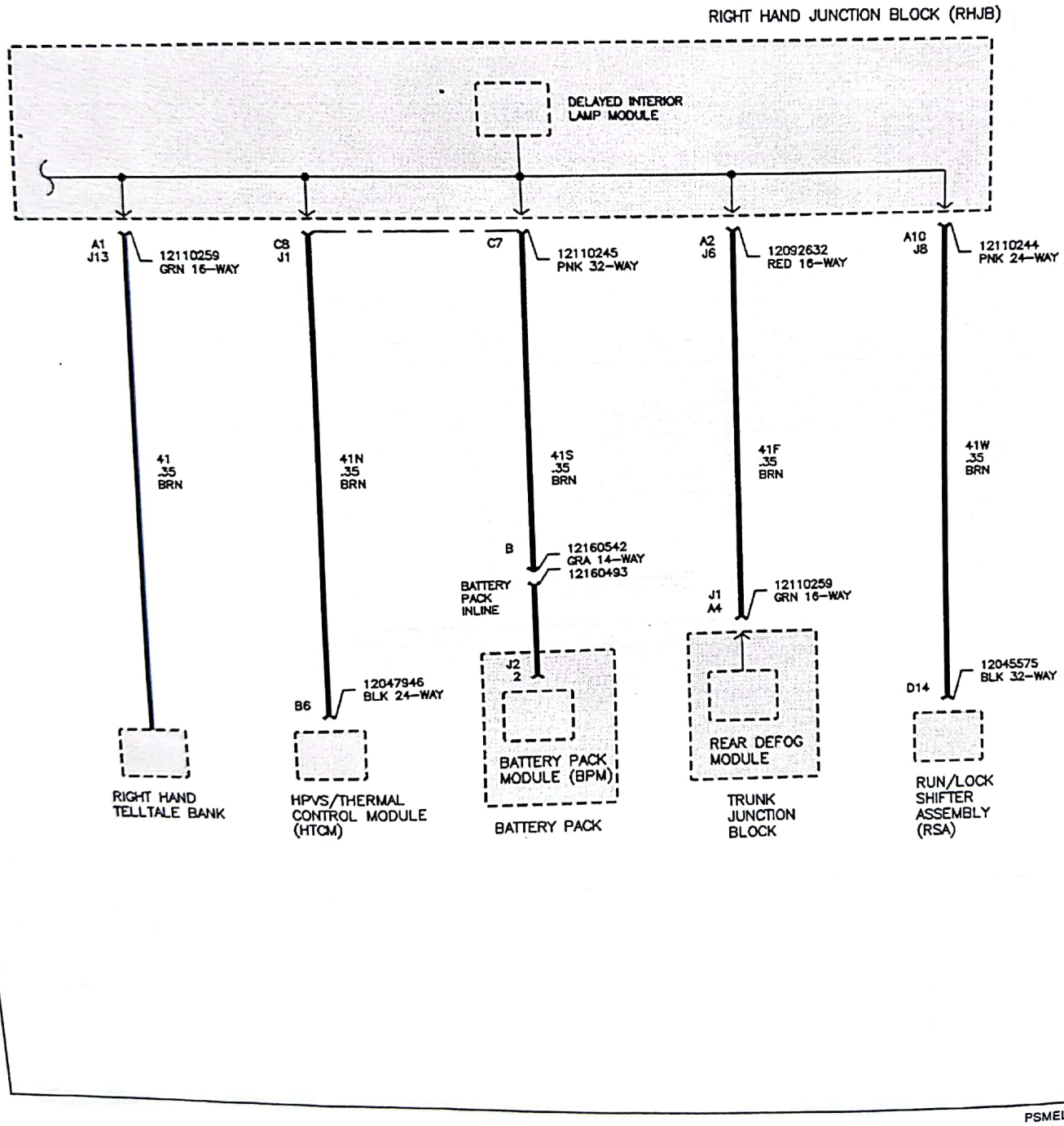

INSTRUMENT PANEL CLUSTER (IPC)
12V
VEHICLE IN RUN/ACC INPUT
DIMMING LEVEL INPUT
DOOR AJAR INPUT
C5
C12
C16
12110207 BLU 32-WAY
80C .35 LT GRN
230E .35 BRN/WHT
1495F .35 DK BLU/WHT
J4 B1
12110088 GRA 24-WAY
J2 C5
12110245 PNK 32-WAY
J1 A1
12110244 PNK 24-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
SEE INTERIOR LIGHTS DIMMING
C15
12110245 PNK 32-WAY
B11 J9
12110244 PNK 24-WAY
B8 J3
B5
12084944 BLK 16-WAY
80B .35 LT GRN
230B .35 BRN/WHT
C15
D2
12045575 BLK 32-WAY
VEHICLE IN RUN/ACC OUTPUT
DIMMING LEVEL OUTPUT (PULSE WIDTH MODULATED)
5V
DOOR AJAR INPUT
RUN/LOCK SHIFTER ASSEMBLY (RSA)
1495A .35 DK BLU/WHT
D5
12045575 BLK 32-WAY
1495E .35 DK BLU/WHT
J8 B1
12110244 PNK 24-WAY
J9 C1
12110245 PNK 32-WAY
1495B .35 DK BLU/WHT
450L .35 BLK
DELAYED INTERIOR LAMP MODULE
DOOR AJAR INPUT
RIGHT HAND JUNCTION BLOCK (RHJB)
B5 J3
B4
12084944 BLK 16-WAY
1495C .35 DK BLU/WHT
350J .35 BLK
D
A
12110196 BLK 2-WAY
RIGHT DOOR JAMB SWITCH
LEFT DOOR JAMB SWITCH
PSMELC67894AA


SEE TELLTALES SECTION
20308 .35 LT GRN
2029 .35 WHT/BLK
419B .35 BRN/WHT
20188 .35 RED
2019 .35 WHT
1084 .35 RED
12110207 BLU 32-WAY
D3
D4
D5
D7
D8
D9
TEMP TELLTALE CONTROL
WAIT TELLTALE CONTROL
SERVICE NOW TELLTALE CONTROL
REDUCED PERFORMANCE TELLTALE CONTROL
BATTERY LIFE TELLTALE CONTROL
CHECK TIRE PRESSURE TELLTALE CONTROL
INSTRUMENT PANEL CLUSTER (IPC)
BACK-UP MODE FLASH TO PASS BELOW 25 MPH
LR TURN SIGNAL INPUT
RR TURN SIGNAL INPUT
12V
HIGH BEAMS ON INPUT
HIGH HORN COMMAND
LOW HORN COMMAND
C6
C8
D14
C11
C3
1334C .35 YEL/BLK
1335C .35 DK GRN/WHT
1192E .35 WHT
2025C .35 PPL
2026C .35 PNK
12110207 BLU 32-WAY
12110245 PNK 32-WAY
12110244 PNK 24-WAY
12110088 GRA 24-WAY
12110245 PNK 32-WAY
C1
J1 A11
J4 A5
J2 D9
D10
SEE EXTERIOR LIGHTING
SEE EXTERIOR LIGHTING
LR TURN OUTPUT
SOLID STATE
RR TURN OUTPUT
HIGH BEAMS ON OUTPUT
SOLID STATE
SOLID STATE
TURN/HAZ/DRL MODULE
HEADLAMP MODULE
HORN MODULE
LEFT HAND JUNCTION BLOCK (LHJB)
PSMELC67895AA


B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION SECTION
20A
HAZ/RUN/ ACC/MISC
TOP RIGHT HAND MAXI FUSE BLOCK
842
1.0
RED
J5
B
12110626
GRA 8-WAY
SEE JUNCTION BLOCK DETAILS
B+
GROUND
RUN 1
POWER MODING MODULE
5A
JUNCTION BLOCK DIAGNOSTIC CONNECTOR
4
A9
J8
12110244
PNK 24-WAY
41A
.35
BRN
J9
A6
12110244
PNK 24-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
LEFT HAND JUNCTION BLOCK (LHJB)
TURN/HAZ/ DRL MODULE
C12
J2
41C
.35
BRN
J1
19
12129025
NAT 32-WAY
J1
6
PROPULSION CONTROL MODULE (PCM)
POWER INVERTER MODULE (PIM)
C13
41B
.35
BRN
C1
12110207
BLU 32-WAY
INSTRUMENT PANEL CLUSTER (IPC)
C14
41G
.35
BRN
E
12092237
GRA 8-WAY
C15
41P
.35
BRN
A
12064760
BLK 4-WAY
TURN/HEADLAMP/ CRUISE SWITCH
C16
12110245
PNK 32-WAY
41R
.80
BRN
C
12040551
BLK 6-WAY
BRAKE SWITCH
E9
J7
12110112
TAN 32-WAY
41E
.35
BRN
B11
12110113
RED 32-WAY
BRAKE/ TORQUE CONTROLLER MODULE (BTCM)
A1
J13
12110259
GRN 16-WAY
41
.35
BRN
LEFT HAND TELLTALE BANK
PSMELC68281AA



PSMELC68282AA

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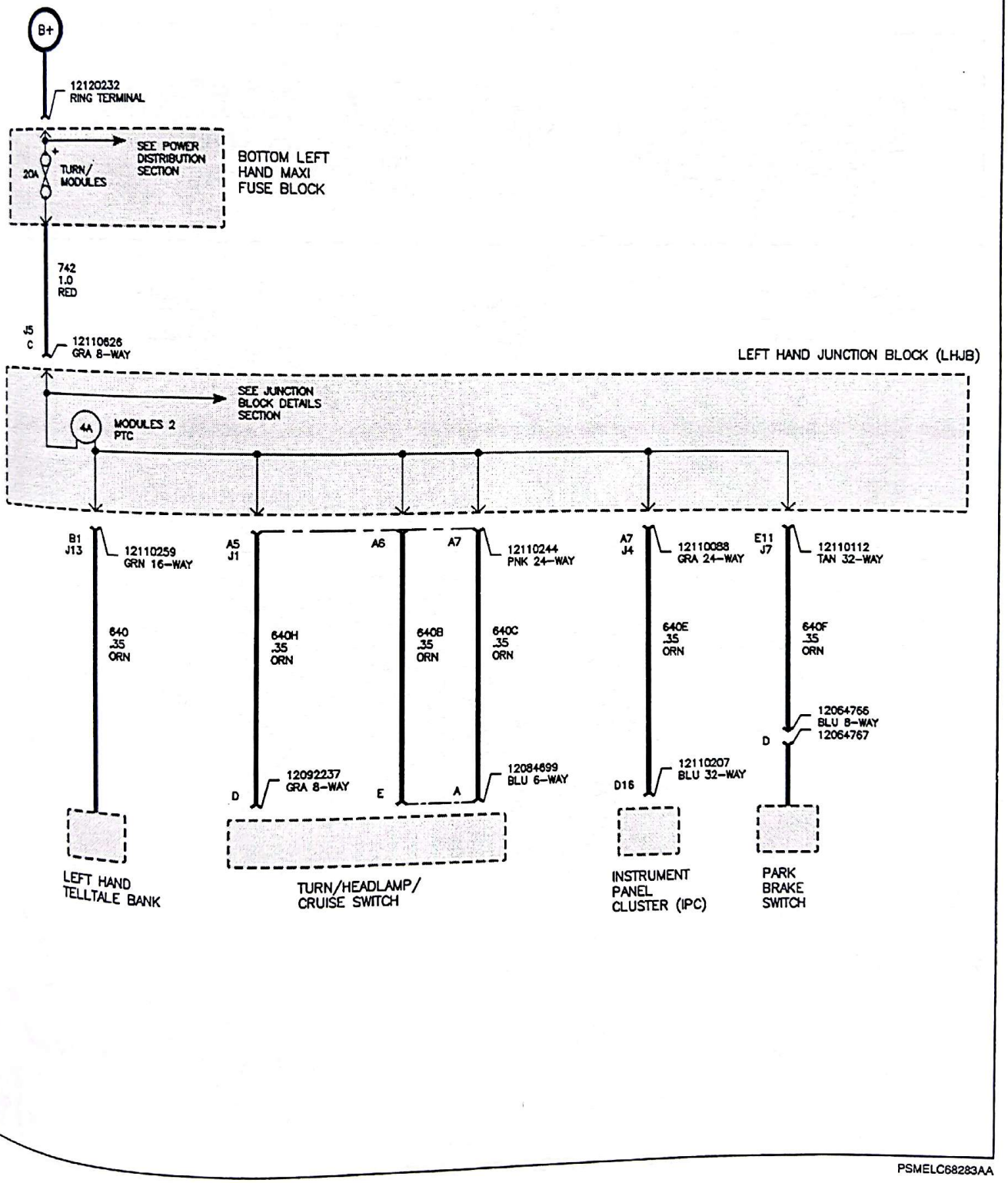
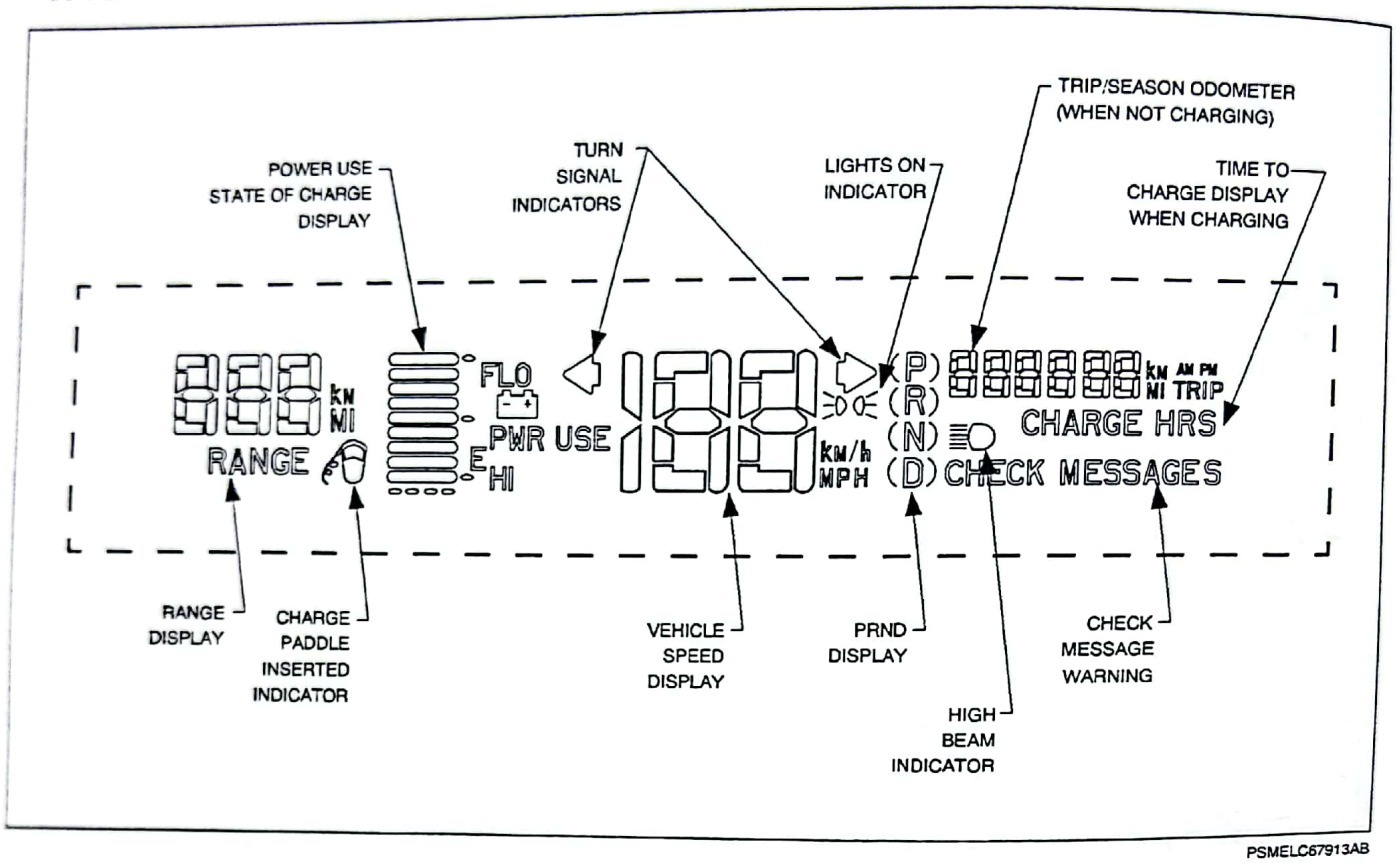


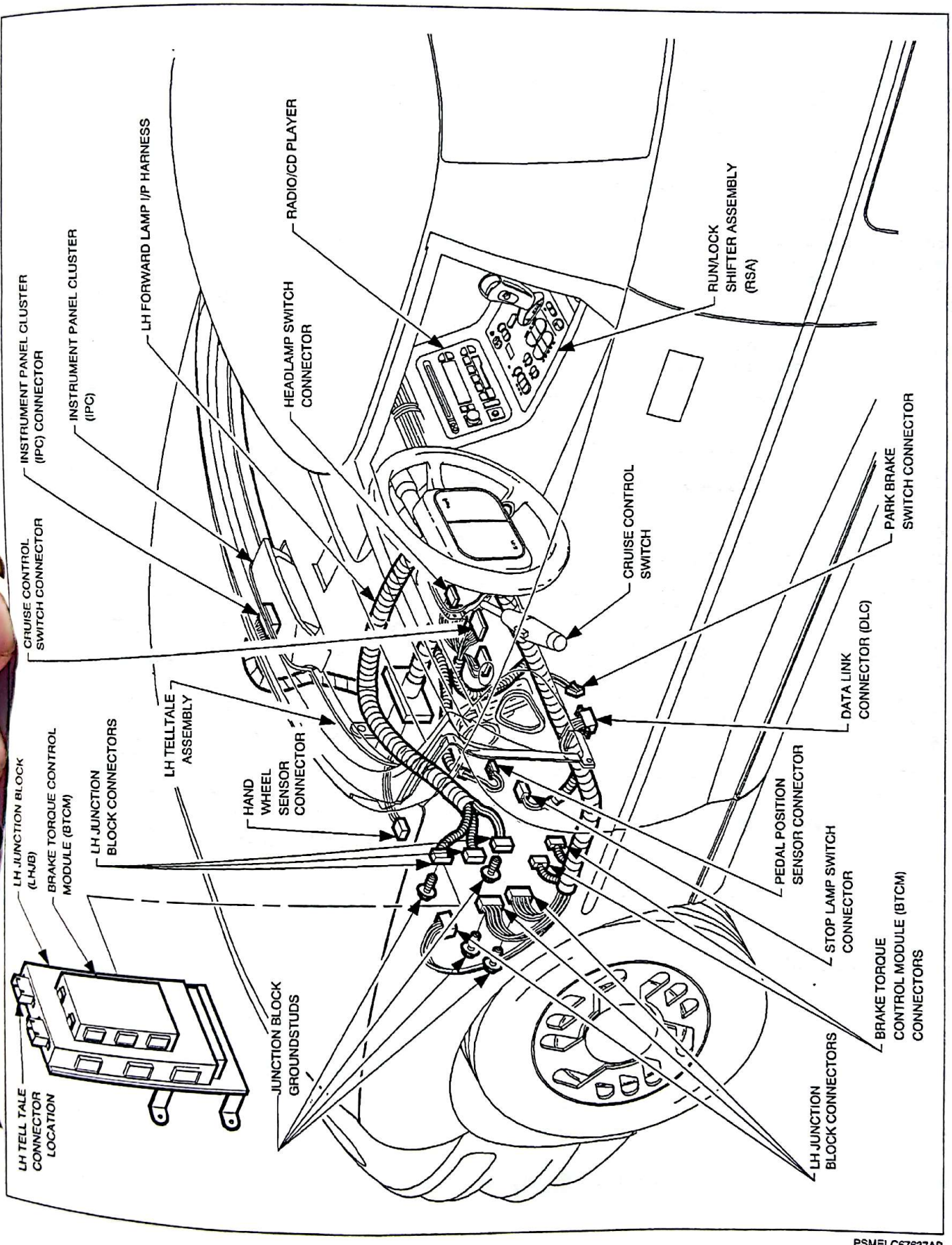
PSMELC68283AA

INSTRUMENT PANEL CLUSTER (IPC)



PSMELC67913AB

INSTRUMENT PANEL CLUSTER (IPC) COMPONENT LOCATION VIEW



PSMELC67637AB

INSTRUMENT PANEL CLUSTER (IPC)

GENERAL DESCRIPTION

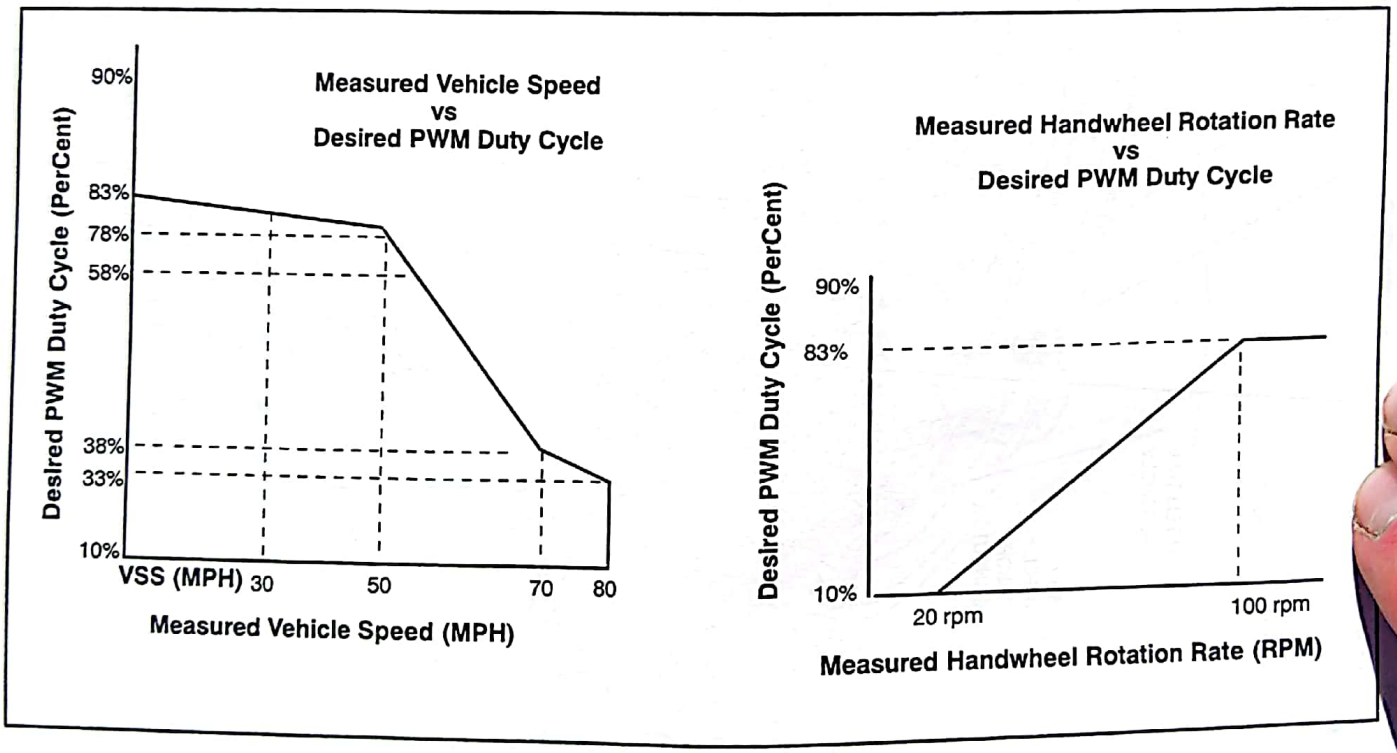
POWER STEERING CONTROL

POWER STEERING HAND WHEEL SENSOR

The instrument panel cluster (IPC) monitors the handwheel sensor feedback voltage whenever in Run mode. A five volt reference is fed to the sensor and a sensor return circuit acts as the sensor ground. The sensor feedback voltage varies between about 0.25v and 4.75v during normal steering maneuvers. The voltage will ramp up and down several times during a full steering maneuver.

COMMANDED STEERING PUMP SPEED

The IPC uses a combination of the handwheel sensor input and vehicle speed input to calculate the steering pump speed signal, which is sent over a discreet line to the power steering control module (PSCM). A PSCM supplied reference voltage is duty cycled between about 20% and 83 % by the IPC. Because of resistors in the PSCM and IPC, the voltage only varies between about 11.0 and 12.8 volts over the entire duty cycle range. The charts below show the relationships between vehicle speed and duty cycle and steering wheel turning rpm and duty cycle. Whichever input results in a larger duty cycle at a given time is used to determine the actual duty cycle. The IPC output drops to 48% when in park after four seconds of nonactivity from the steering wheel sensor. The output drops and remains at 20% whenever the charge paddle is inserted.



TELLTALE CONTROL

The IPC is responsible for turning on seven telltales. Six of the telltales, – Service Now, Temp, Reduced Performance, Battery Life, Wait, and Check Tire Pressure are turned on when the IPC receives a request from other modules. The seatbelt telltale is turned on directly by the IPC in response to a discreet input from the drivers seat belt switch.

The IPC monitors the SIR telltale control circuit (grounded by the sensing and diagnostic module [SDM]) to determine if the SIR telltale is commanded On.

The IPC also receives serial data messages letting it know if certain telltales are being turned on (SECURITY, BRAKE System and ANTILOCK telltales).

For more information on the operation of these telltales refer to "Telltales."

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SEAT BELT SWITCH INPUT

The IPC monitors the seat belt switch circuit 238 to see if the driver's seat belt is buckled. If it is not buckled, circuit 238 is pulled low by the switch and the IPC grounds circuit 234 to turn on the fasten seat belt telltale. While the seat belt remains unbuckled the IPC will turn On the CHECK MESSAGES warning for seven seconds, once every five minutes. Whenever the CHECK MESSAGES warning comes On, the IPC sounds a single chime.

VEHICLE SPEED INPUT

The IPC receives a 4000 pulse per mile speed input from the PCM over a dedicated circuit 389.

TURN SIGNAL INDICATORS

The turn signal inputs provide battery voltage to the IPC from the same circuits that feed the left and right turn signal bulbs. The IPC uses these inputs to determine when to turn on the turn signal indicators on its display. If both lines go high at the same time, both signals are flashed together to indicate hazard flashers.

RANGE DISPLAY

The RANGE display gives an approximate range that the vehicle can travel on the remaining charge. This range is calculated based on the state of charge of the battery pack and on recent driving/idling of the vehicle. The range can therefore change considerably as driving conditions and habits are altered during a given charge.

ENERGY REMAINING (STATE OF CHARGE)

The state of charge indicator is similar to the fuel gage in an internal combustion vehicle. It shows the amount of useable charge left on the battery pack. There are 11 bars that make up this indicator, each one representing about 9% of total charge. The GAGE button on the run/lock/shifter assembly (RSA) toggles the display between the power remaining and power use displays.

POWER USE DISPLAY

The power use (PWR USE) display is a gauge showing how quickly power is being used. This display provides instant feedback to the driver so they can be aware of how driving habits and features enabled on the car affect power use. By referring to this gage drivers can modify their driving to maximize the range they can travel on one charge. The bars are not equal in value. Refer to the table below for the power use represented by each bar. The table is laid out in the same manner as the display on the IPC. While charging, the power use display indicates how much energy is being put into the pack.

POWER USE DISPLAY		COMPONENT POWER USE		
50001 or more Watts	BAR #11	Radio	Watts	BAR #11
30001 to 50000 Watts	BAR #10	Braking 50	Watts	BAR #10
20001 to 30000 Watts	BAR #9	On Board Controllers 70	Watts	All seven controllers.
12001 to 20000 Watts	BAR #8	Headlights 200	Watts	Low beam, includes tail and marker lamps.
8001 to 1200 Watts	BAR #7	Low A/C 400	Watts	Steady state operation, includes blower and front fan.
4501 to 8000 Watts	BAR #6	Rear Defogger 450	Watts	
2001 to 4500 Watts	BAR #5	Heated Windshield 700	Watts	
1001 to 2000 Watts	BAR #4	Max A/C 1,700	Watts	Steady state operation, includes blower and front fan.
501 to 1000 Watts	BAR #3	Motor @ 55 MPH 7,000	Watts	Steady speed, level road, 70°F ambient.
101 to 500 Watts	BAR #2	Motor @ WOT 118,000	Watts	Wide Open Accelerator, level road, 70°F ambient.
0 to 100 Watts	BAR #1			

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HI BEAM INDICATOR

The IPC turns on the high beam indicator whenever it sees power on the left high beam circuit 1192E.

CHECK MESSAGES WARNING

The CHECK MESSAGES indicator warning serves as an indicator/reminder to the driver. It lights up to indicate that a telltale has been turned On or is still On. If any of the telltales (except hazard, parking brake, or low traction) stay On, the CHECK MESSAGES indicator warning is turned On for seven seconds once every five minutes. Whenever the IPC turns on the CHECK MESSAGES indicator warning, it also sounds a single chime to call attention to the warning.

CHARGE HOURS AND CHARGE INDICATOR

When the charge paddle is fully inserted into the charge port, the paddle indicator shows up on the IPC, the PRND display goes away, and the trip/season odometer is replaced with charge hours. The charge hours (CHARGE HOURS) display shows how long the vehicle calculates it will require to bring the battery pack to a full state of charge. The display shows hours and minutes just like a digital clock. This time will vary significantly based on current state of charge (USOC), battery temperatures, and which charger is being used. There is a wall mounted charger that runs off of a 240 volt 30 amp. supply and a portable charger that requires a 120 volt outlet with a 12 amp. capability. For more information, refer to the Battery and Charging service manual.

TRIP/SEASON ODOMETER

The trip odometer shows how many miles/km the vehicle has traveled since the last time it was reset. The trip odometer rolls over to zero at 32186.8 km (19,999.9 miles). If battery power to the IPC is lost, the trip odometer resets to zero. Pressing the trip button on the RSA toggles this display between trip odometer and season odometer. The season odometer value is stored in non volatile memory (loss of battery power does erase this data). The season odometer reads up to a maximum value of 499,999 miles, then remains at that reading.

PRND (PARK, REVERSE, NEUTRAL, DRIVE)

The Park, Reverse, Neutral, Drive (PRND) indicator shows what shifter position the vehicle is in. These positions correspond to the gear positions on internal combustion vehicles.

IPC CHIMES

There are a number of different chime signals sounded by the IPC. They are: seat belt unbuckled, key reminder, park lamps left On, turn signal On for extended time, and CHECK MESSAGES indicator.

The seat belt unbuckled warning sounds at 50 chimes/minute for four to eight seconds after entering the RUN mode or until the driver's seat belt is buckled.

The key reminder warning sounds at 120 chimes/minute whenever the car is in OFF/ACC or RUN mode and the driver or passenger door is open.

The park lamp warning sounds at 180 chimes/minute whenever the park lamps are On, the car is not in RUN mode, and the driver's or passenger's door is open.

The extended turn signal on warning sounds in sync with the turn signal flasher if either turn signal has been operating for more than 1.6 km (1 mile).

The check messages warning sounds one time each time the CHECK MESSAGES indicator warning is turned On.

AIR BAG TELLTALE

The IPC monitors the air bag telltale circuit 358 to determine if it is grounded by the SDM. If circuit 358 is grounded, the IPC sets a history DTC 40 and initiates a single chime and the CHECK MESSAGES indicator warning.

KEYMINDER

The RSA signals the IPC whenever the car is in the RUN or ACC mode over the keyminder circuit. Whenever a door is open, the IPC tries to put out battery voltage over the keyminder circuit. If the RSA is in RUN or ACCY mode it pulls the keyminder circuit down to about 1.5 – 2.0 volts. This tells IPC to turn on the keyminder warning.

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DISPLAY STEERING CHIME MODULE (IPC) TROUBLE TREE INDEX

- Chart 1 – Instrument Panel Cluster (IPC) Blank
- Chart 2 – IPC Flashing/Erratic
- Chart 3 – VSS Erratic/Flashing/Zero All the Time
- Chart 4 – Power Steering – Lack of Assist/Erratic Assist
- Chart 5 – Chime Problems
- Chart 6 – Seat Belt Telltale Inoperative
- Chart 7 – Seat Belt Telltale On All the Time
- Chart 8 – PRND Display Incorrect/All Lit Up
- IPC DTC 11 – Loss of BPM Poll
- IPC DTC 12 – Loss of PCM Eavesdrop
- IPC DTC 13 – Loss of HTCM Eavesdrop
- IPC DTC 14 – Loss of RSA Eavesdrop
- IPC DTC 15 – Loss of BTCM Eavesdrop
- IPC DTC 16 – Handwheel Sensor Fault
- IPC DTC 31 – HTCM Service Now Telltale
- IPC DTC 32 – HTCM Temperature Telltale
- IPC DTC 33 – PCM Service Now Telltale
- IPC DTC 34 – PCM Temperature Telltale
- IPC DTC 35 – BPM Service Now Telltale
- IPC DTC 36 – BPM Temperature Telltale
- IPC DTC 37 – Reduce Performance Telltale
- IPC DTC 38 – Battery Life Telltale
- IPC DTC 39 – Check Tire Pressure Telltale
- IPC DTC 40 – Air Bag (SIR) Telltale
- IPC DTC 41 – Security Telltale
- IPC DTC 42 – Brake Telltale
- IPC DTC 43 – Anti-Lock Telltale
- IPC DTC 44 – Seatbelt Telltale
- IPC DTC 45 – PCM Service Soon Telltale

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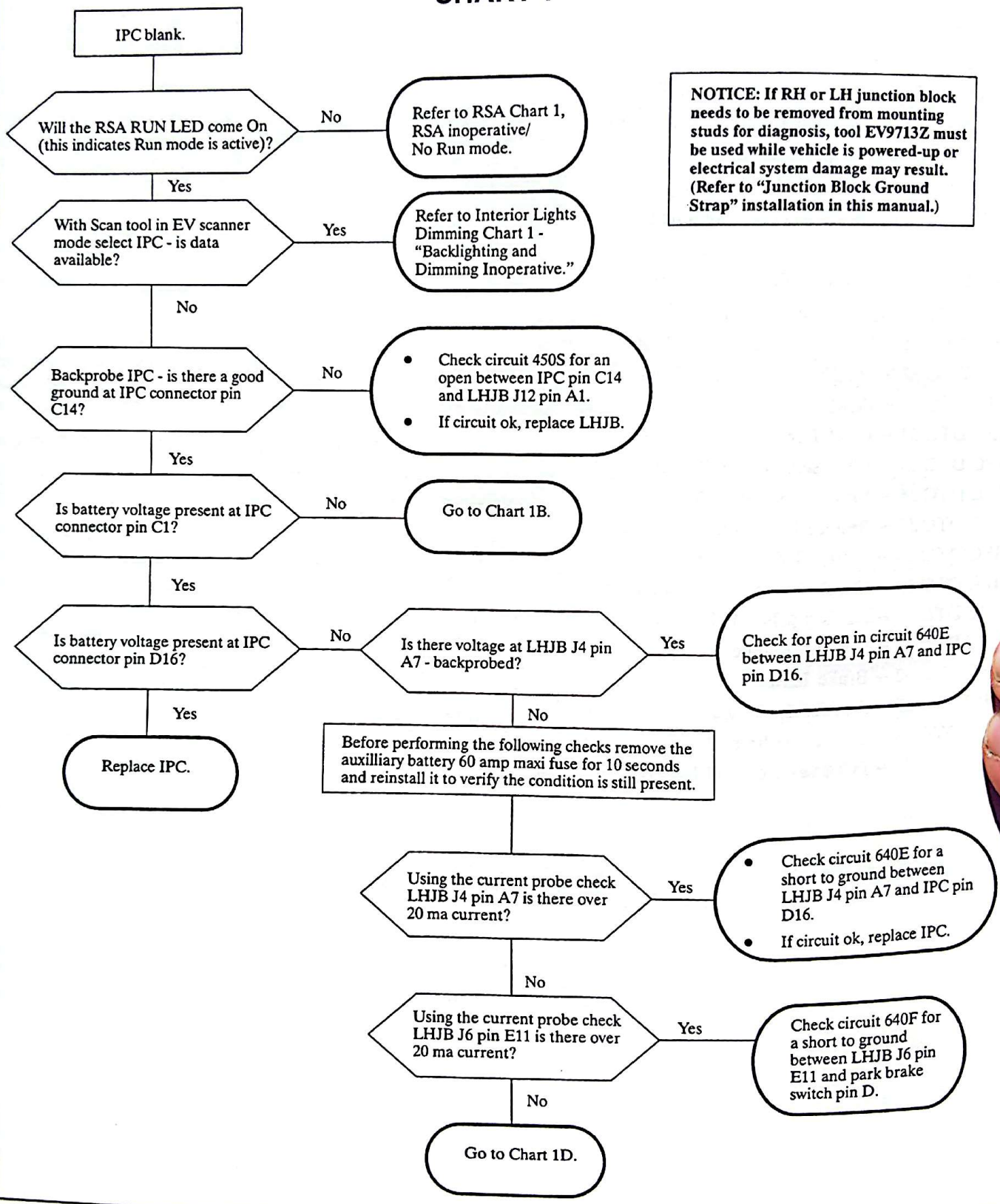
INSTRUMENT PANEL CLUSTER (IPC) BLANK

CHART 1



NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

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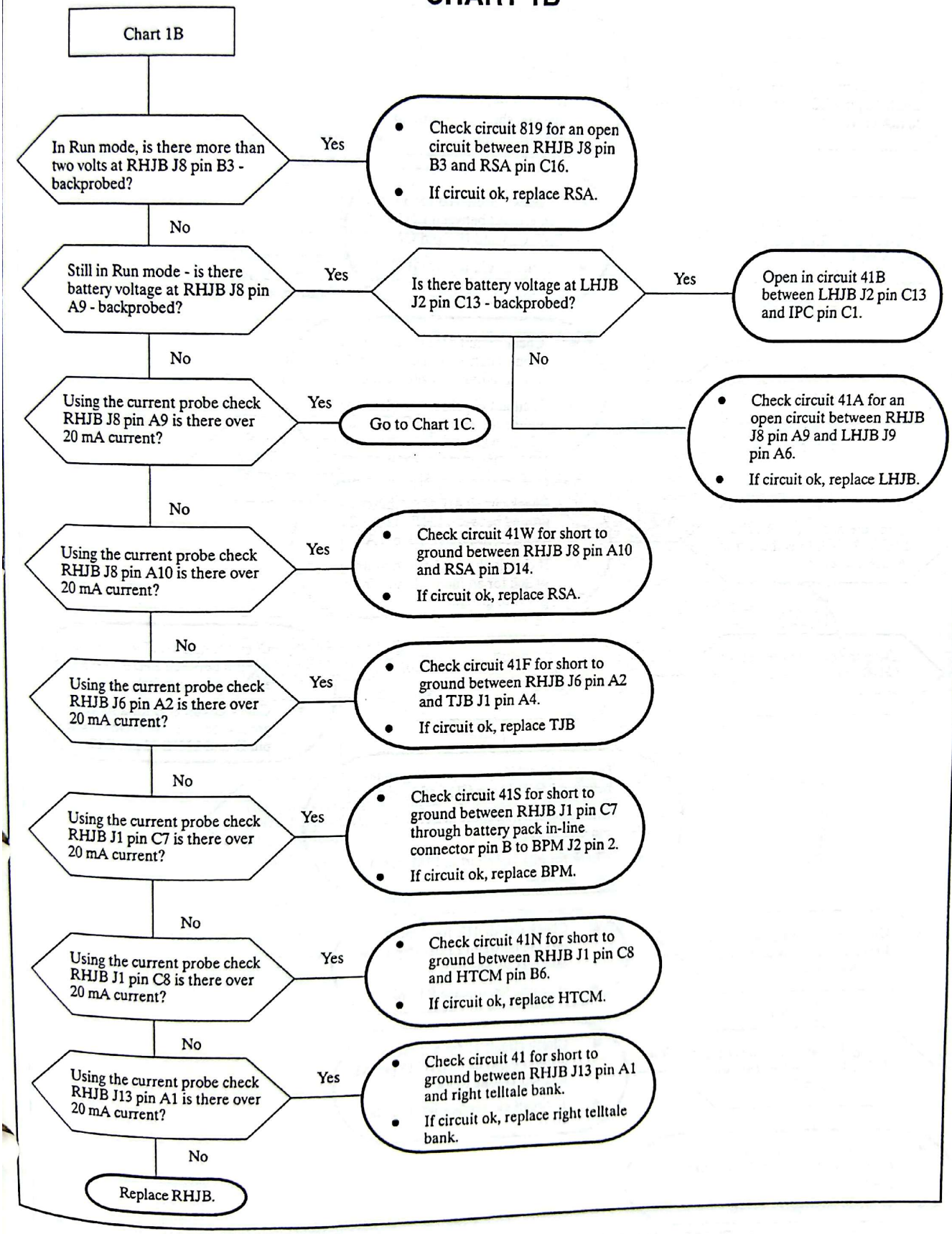
INSTRUMENT PANEL CLUSTER (IPC) BLANK

CHART 1B



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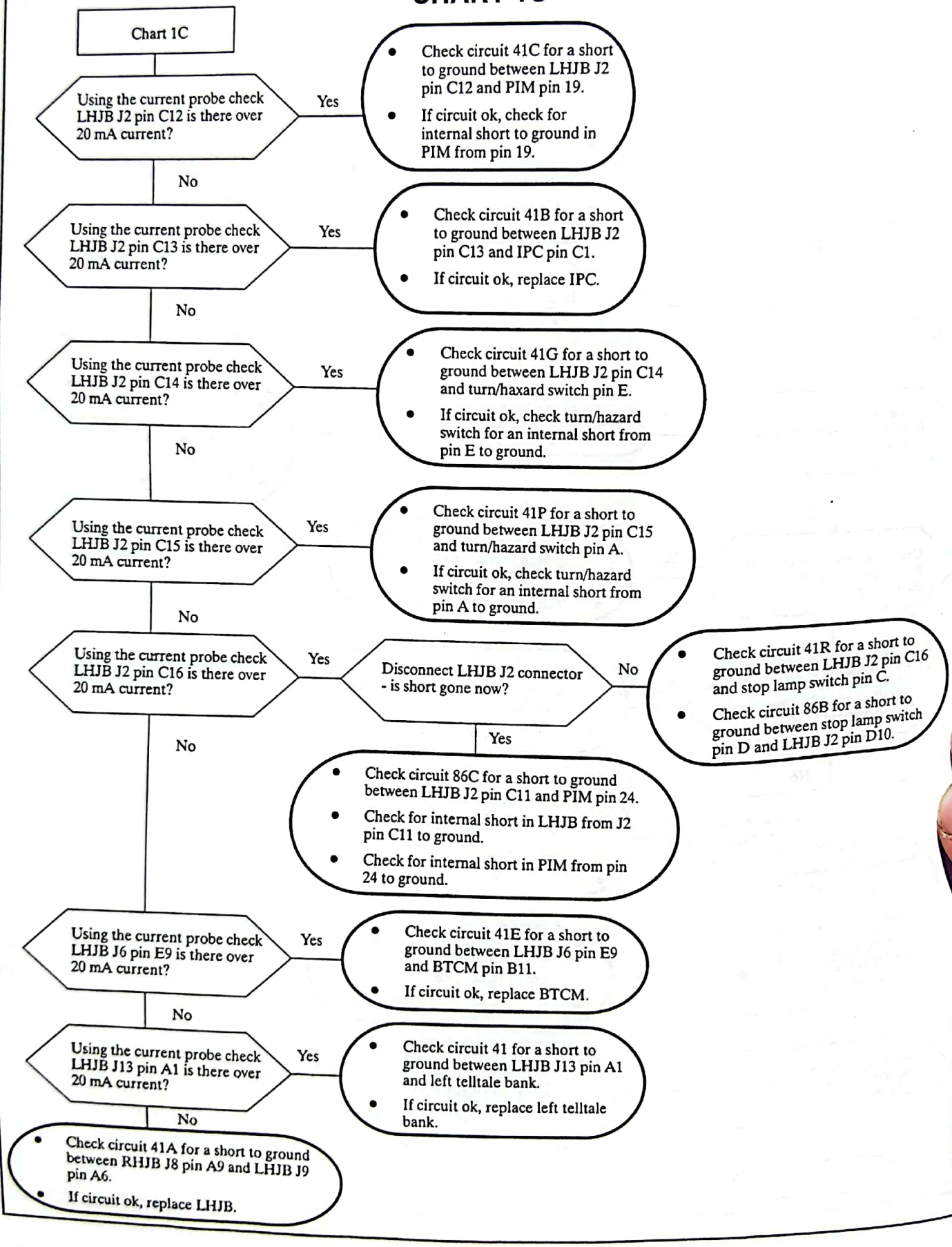
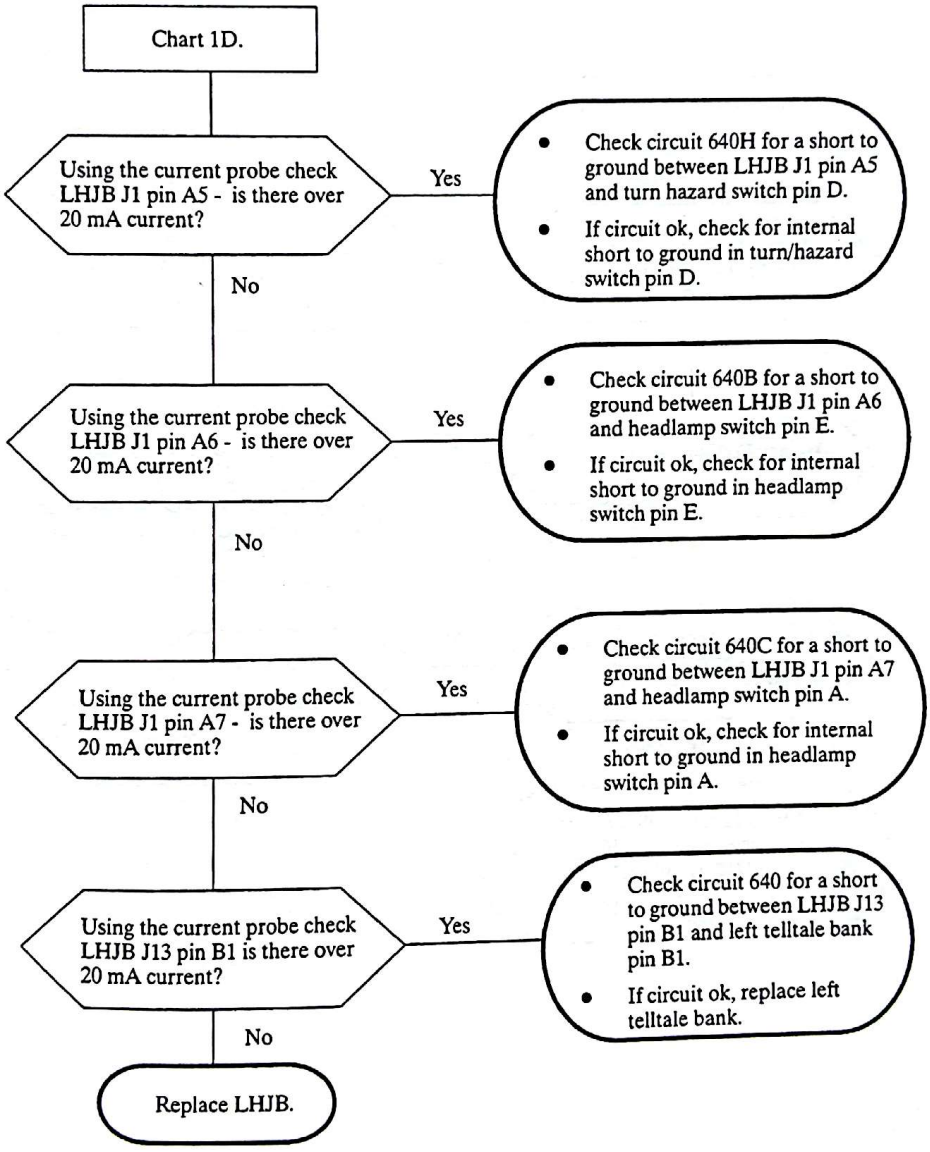
INSTRUMENT PANEL CLUSTER (IPC) BLANK
CHART 1C



INSTRUMENT PANEL CLUSTER (IPC) BLANK

CHART 1D



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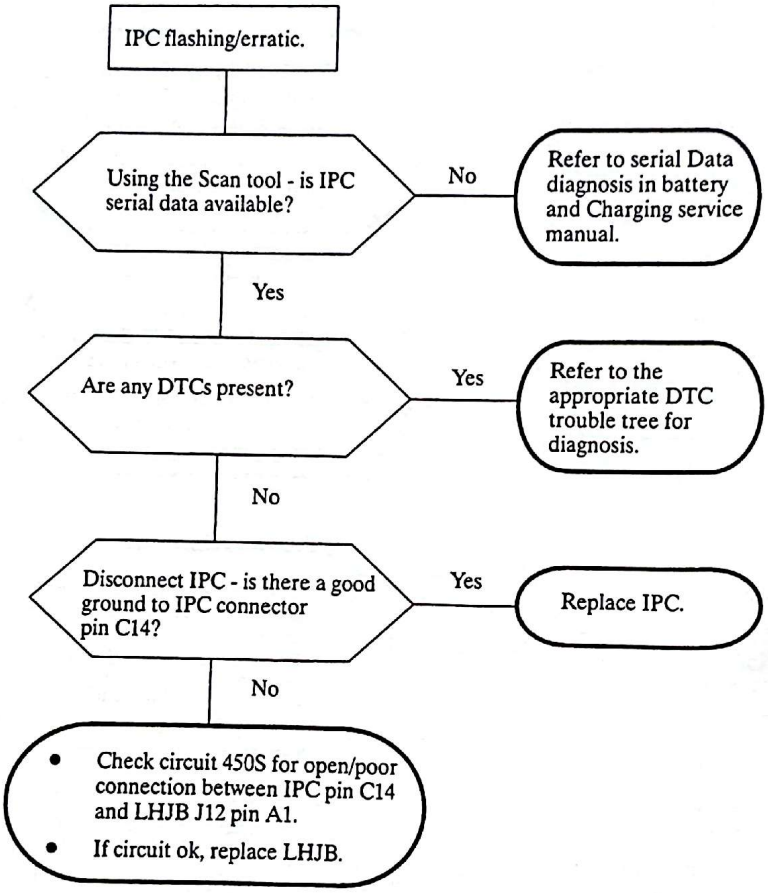
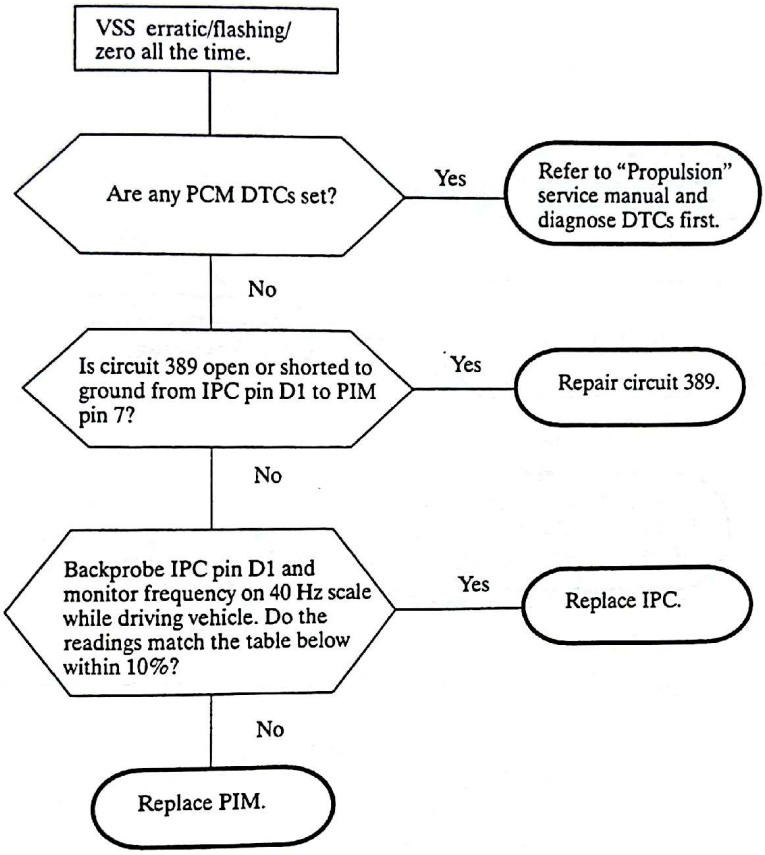
IPC FLASHING/ERRATIC

CHART 2



VSS ERRATIC/FLASHING/ZERO ALL THE TIME

CHART 3



Vehicle Speed	IPC Pin D1 Hz 40 Hz Scale (+/– 10%)
0	.00
10	11.5
20	22.5
30	33.5
40	44.5
50	55.5
60	67.5
70	77.5
80	88.5

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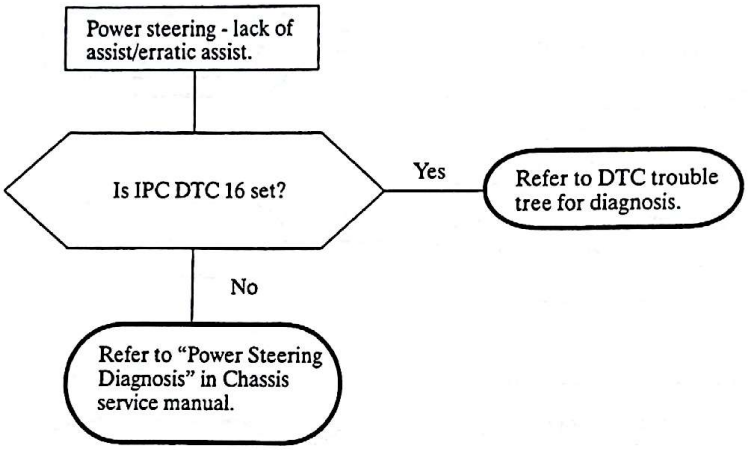
POWER STEERING – LACK OF ASSIST/ERRATIC ASSIST

CHART 4



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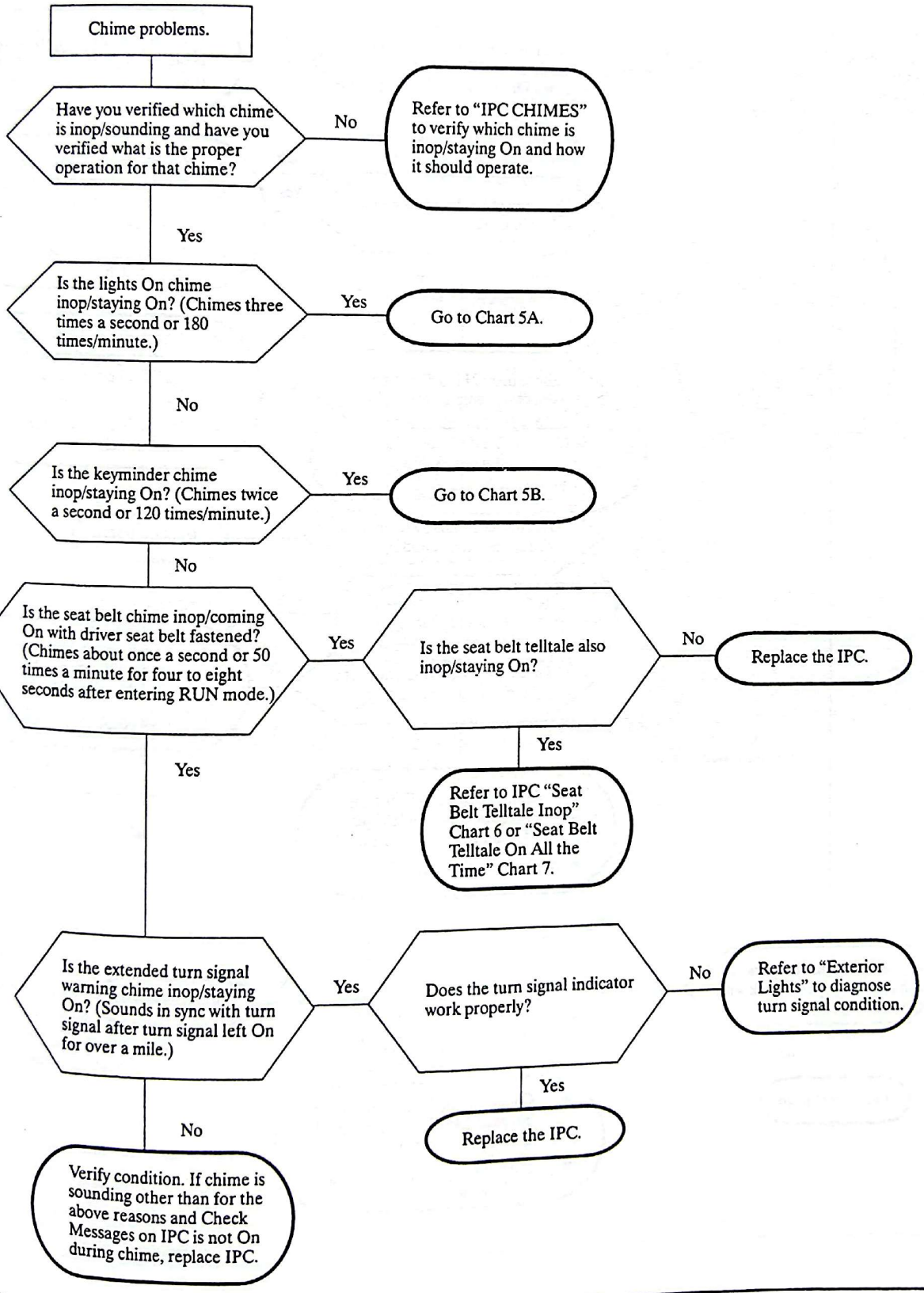
CHIME PROBLEMS

CHART 5



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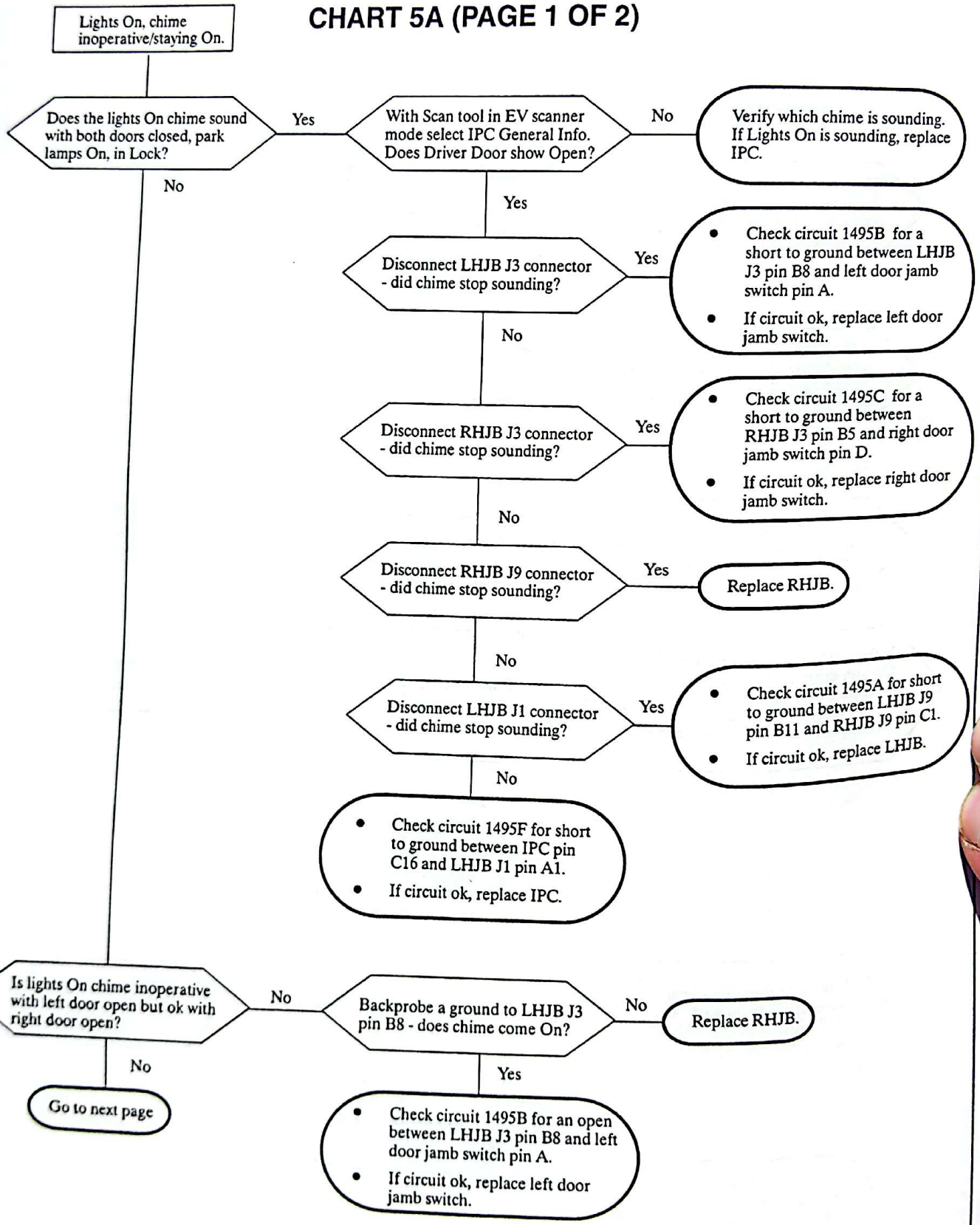
LIGHTS ON CHIME INOPERATIVE/STAYING ON

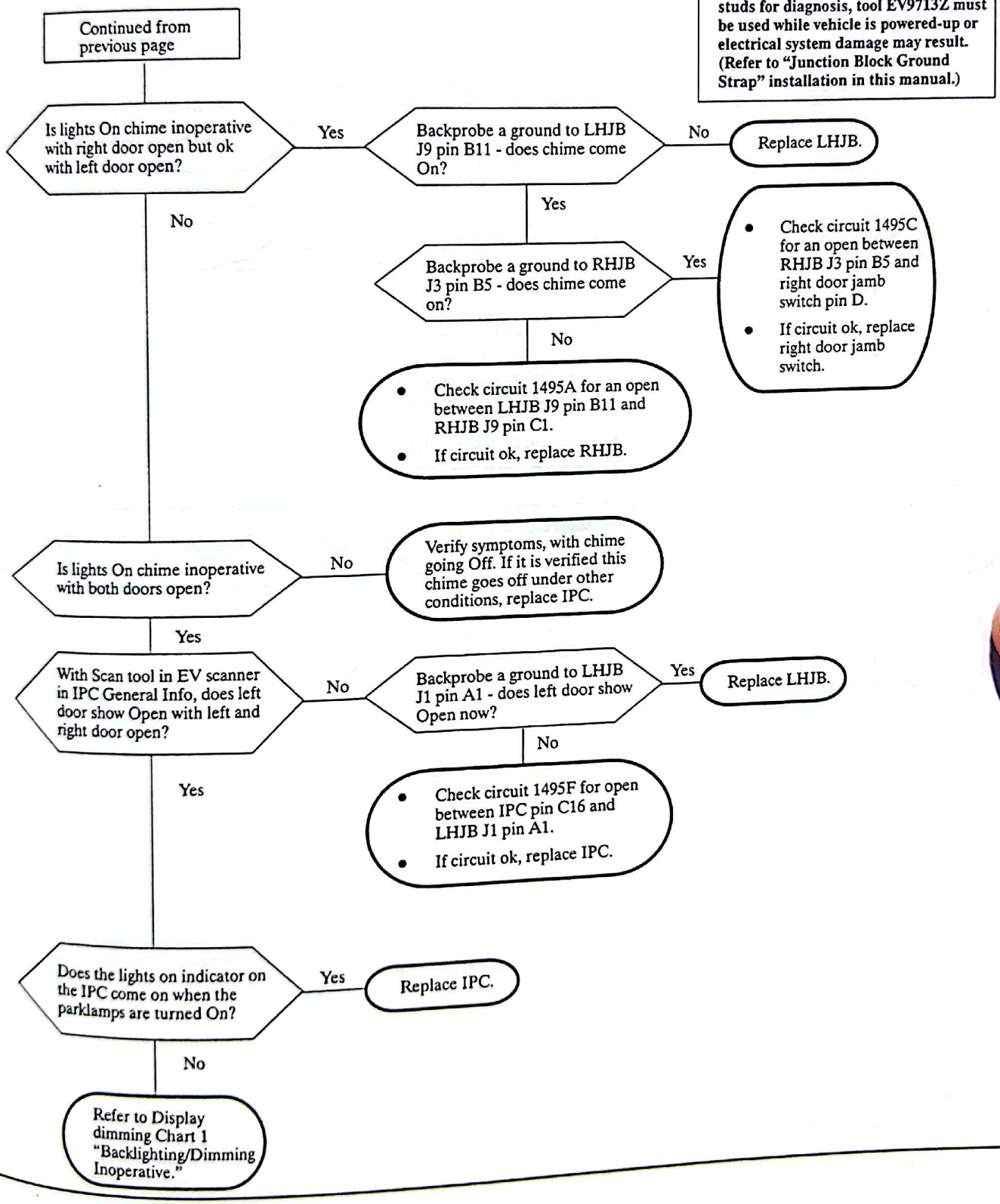
CHART 5A (PAGE 1 OF 2)



LIGHTS ON CHIME INOPERATIVE/STAYING ON

CHART 5A – (PAGE 2 OF 2)

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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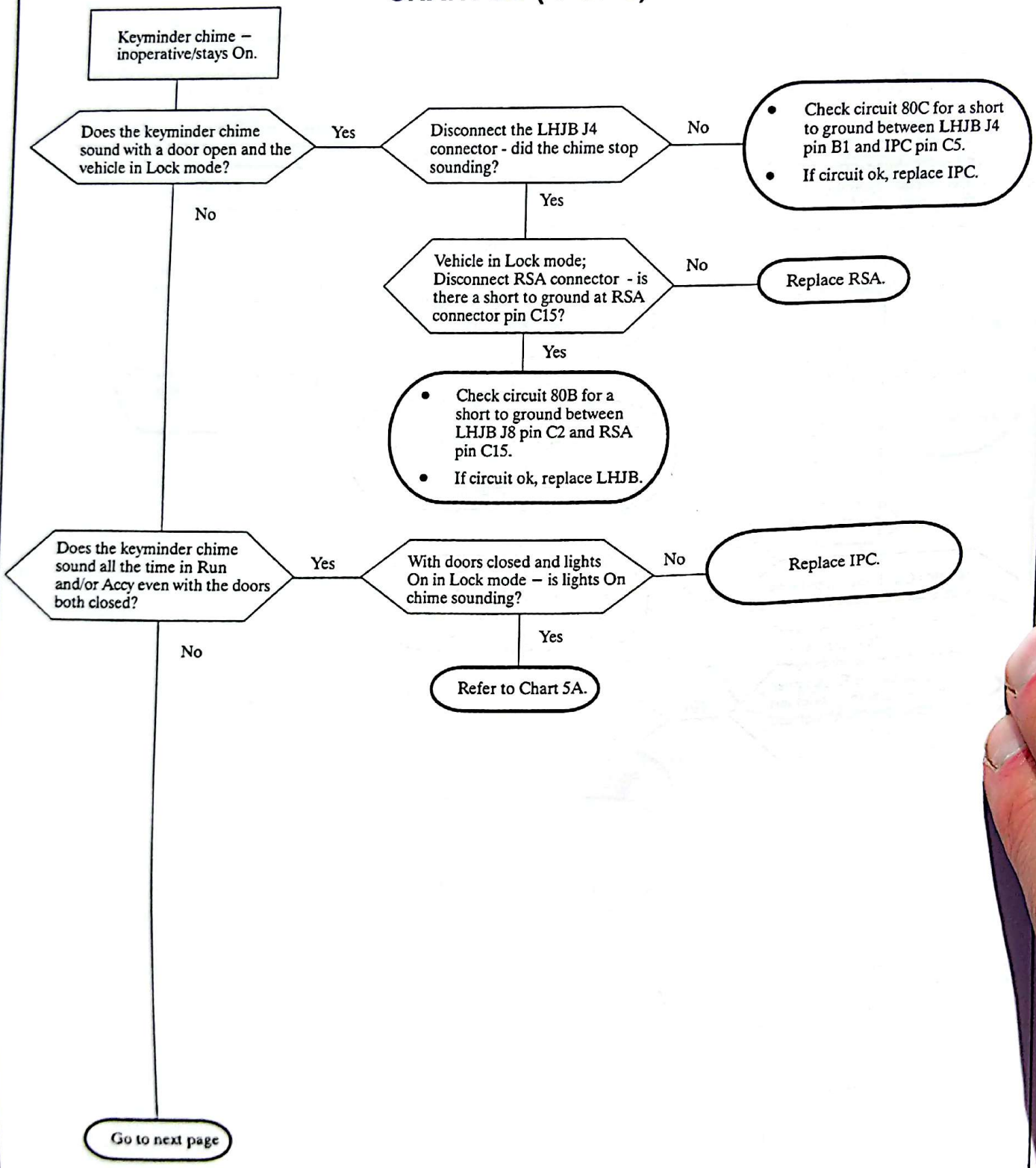
KEYMINDER CHIME – INOPERATIVE/STAYS ON

CHART 5B (1 OF 3)



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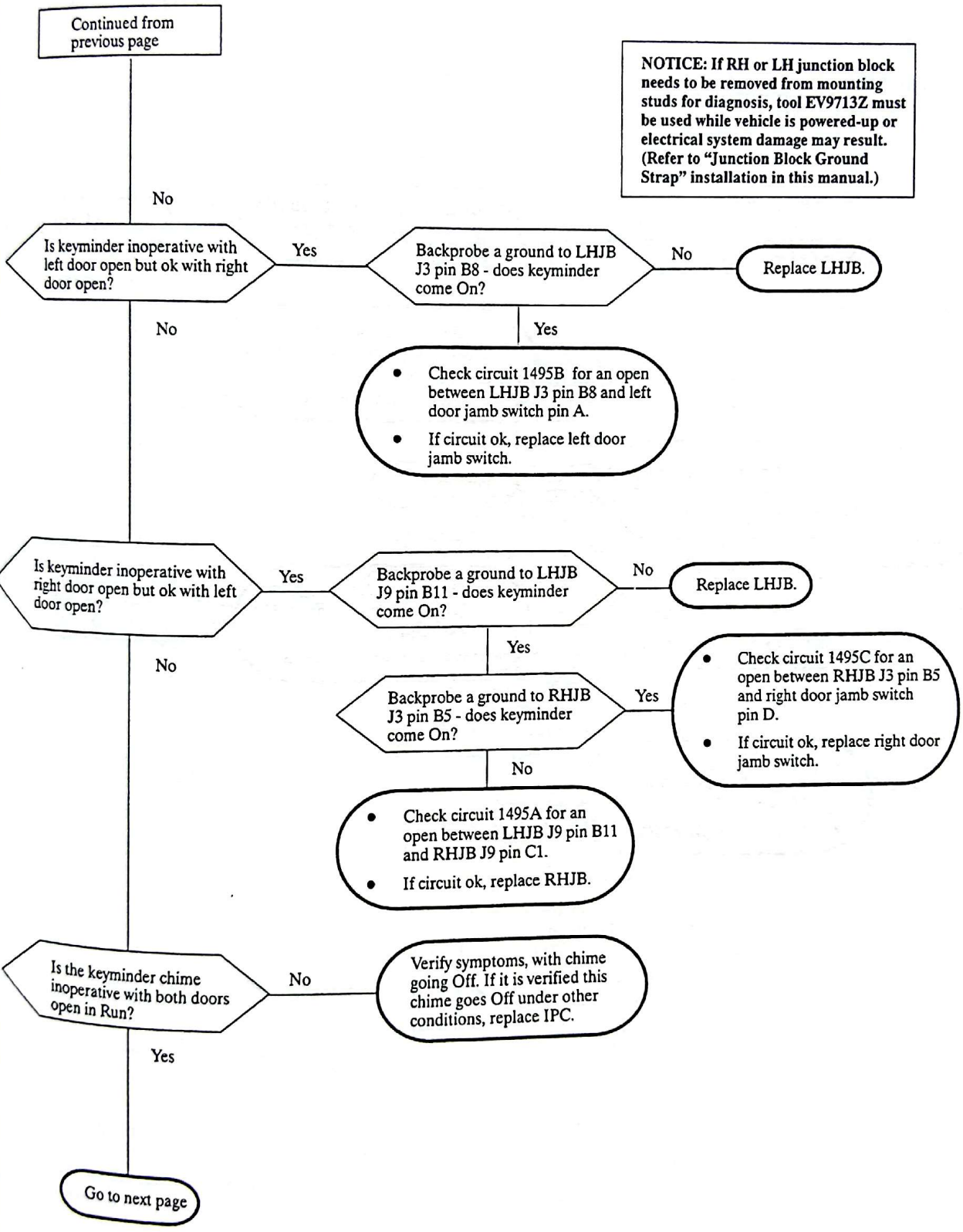
KEYMINDER CHIME – INOPERATIVE/STAYS ON

CHART 5B – (PAGE 2 OF 3)



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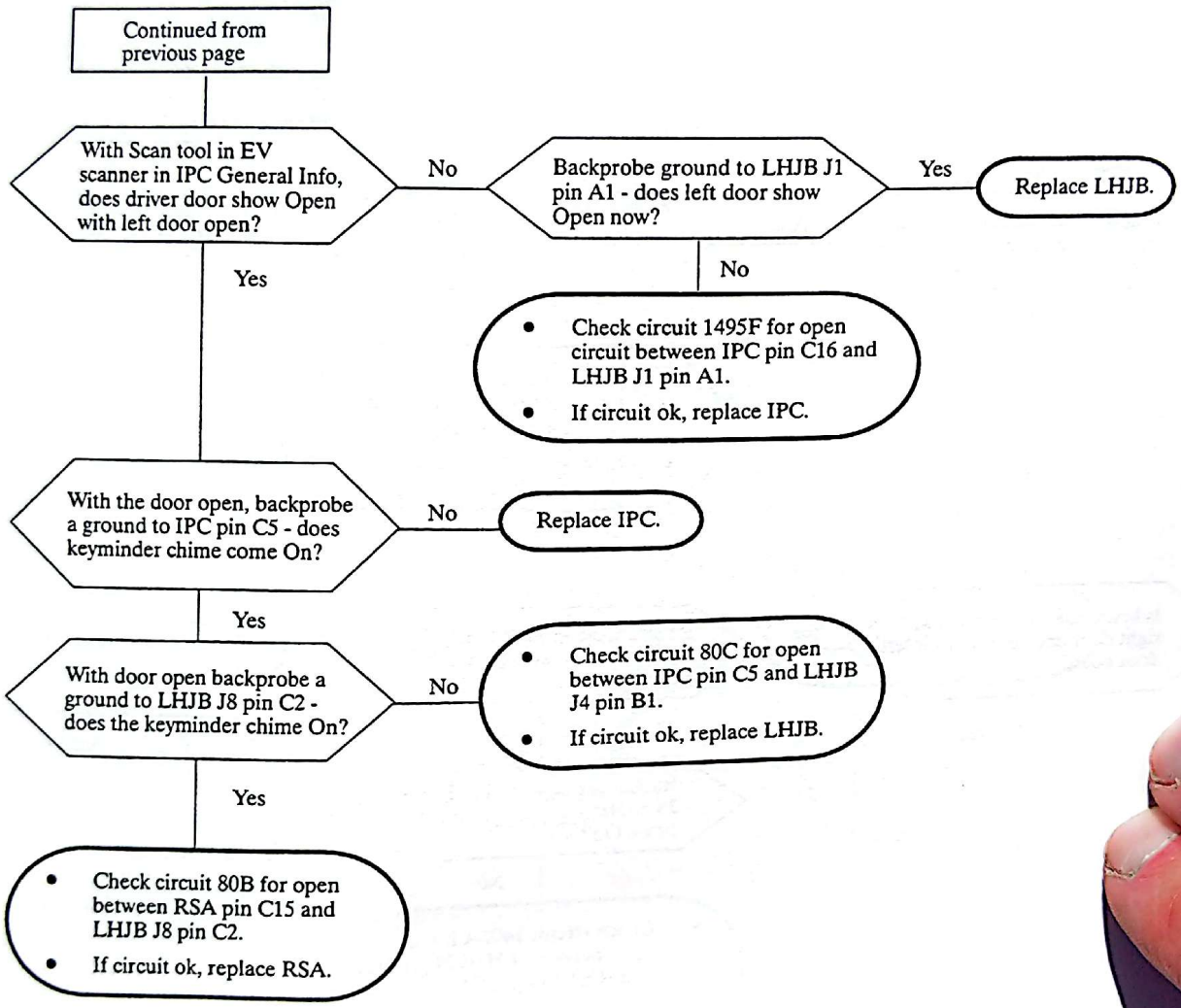
KEYMINDER CHIME – INOPERATIVE/STAYS ON

CHART 5B – (PAGE 3 OF 3)



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SEAT BELT TELLTALE INOPERATIVE

CHART 6

seat belt telltale inoperative.

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Do the other telltales in the right telltale bank come On during bulb check?

- No → Refer to Telltale section diagnosis - Chart 17 or 18.
- Yes →

Does the seat belt telltale come On during bulb check?

- No → Does the seat belt telltale come On with IPC pin D6 grounded in Run mode?
  - Yes → Replace IPC.
  - No → Does the seat belt telltale come On with LHJB J8 pin D3 grounded in Run mode?
    - Yes →
      - Check circuit 234C for an open between IPC pin D6 and LHJB J2 pin D6.
      - If circuit ok, replace LHJB.
    - No → Does the seat belt telltale come On with RHJB J13 pin A6 backprobed to ground in Run mode?
      - Yes →
        - Check circuit 234A for an open between LHJB J8 pin D3 and RHJB J9 pin D3.
        - If circuit ok, replace RHJB.
      - No →
        - Check circuit 234 for an open between telltale bank and RHJB J13 pin A3.
        - If circuit ok, replace right telltale bank.
- Yes →

With the driver's seat belt unbuckled, on the Scan tool select EV scanner mode IPC General Info - does the driver seatbelt switch input show off?

- Yes → Replace IPC.
- No →

Driver's seat belt still unbuckled – Scan tool in EV scanner mode SDM General Info - does the driver seatbelt switch input show OFF?

- Yes → Backprobe IPC pin D10 in Run mode - is battery voltage present?
  - Yes → Replace IPC.
  - No →
    - Check for open in circuit 238B from LHJB J1 pin B10 to IPC pin D10.
    - If circuit ok, replace LHJB.
- No →

Jumper LHJB J10 pins A2 to A3 - does telltale come On now?

- No → Replace LHJB.
- Yes →
  - Check for open in circuit 238C from LHJB J10 pin A2 to seat belt buckle pin A.
  - Check for open in circuit 450W from LHJB J10 pin A3 to seat belt buckle pin B.
  - If circuits ok, replace left seat belt buckle.

IPC GENERAL INFORMATION

SEATBELT STATUS	SEATBELT SWITCH STATUS	TELLTALE STATUS	PDT DISPLAY (SEATBELT TT)	PDT DISPLAY (DRIVER SEATBELT)
Unbucled	Closed	ON	ON	OFF
Buckled	Open	OFF	OFF	ON

SDM GENERAL INFORMATION

SEATBELT STATUS	SEATBELT SWITCH STATUS	TELLTALE STATUS	PDT DISPLAY (DRIVER SEATBELT)
Unbucled	Closed	ON	OFF
Buckled	Open	OFF	ON

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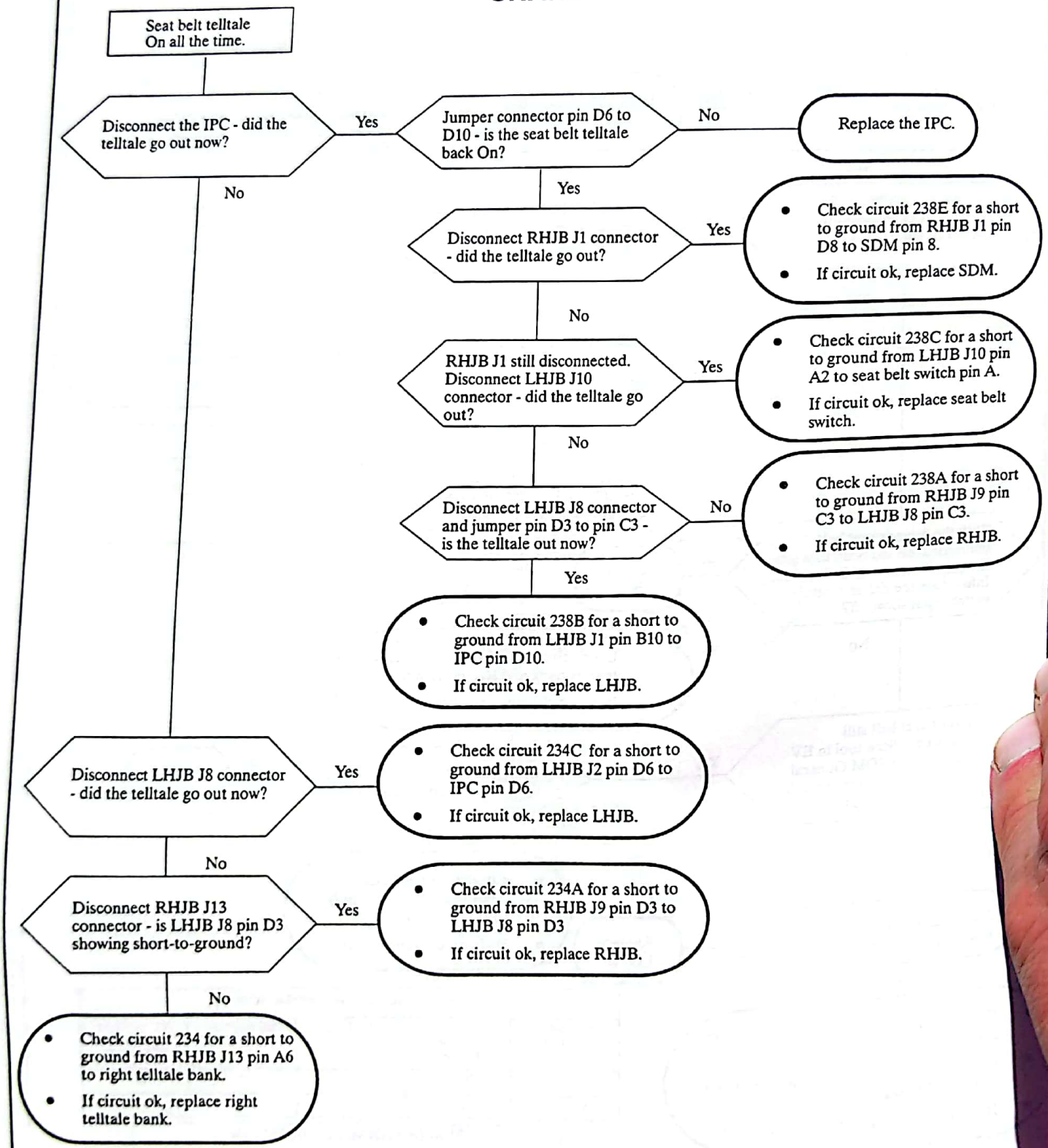
SEAT BELT TELLTALE ON ALL THE TIME

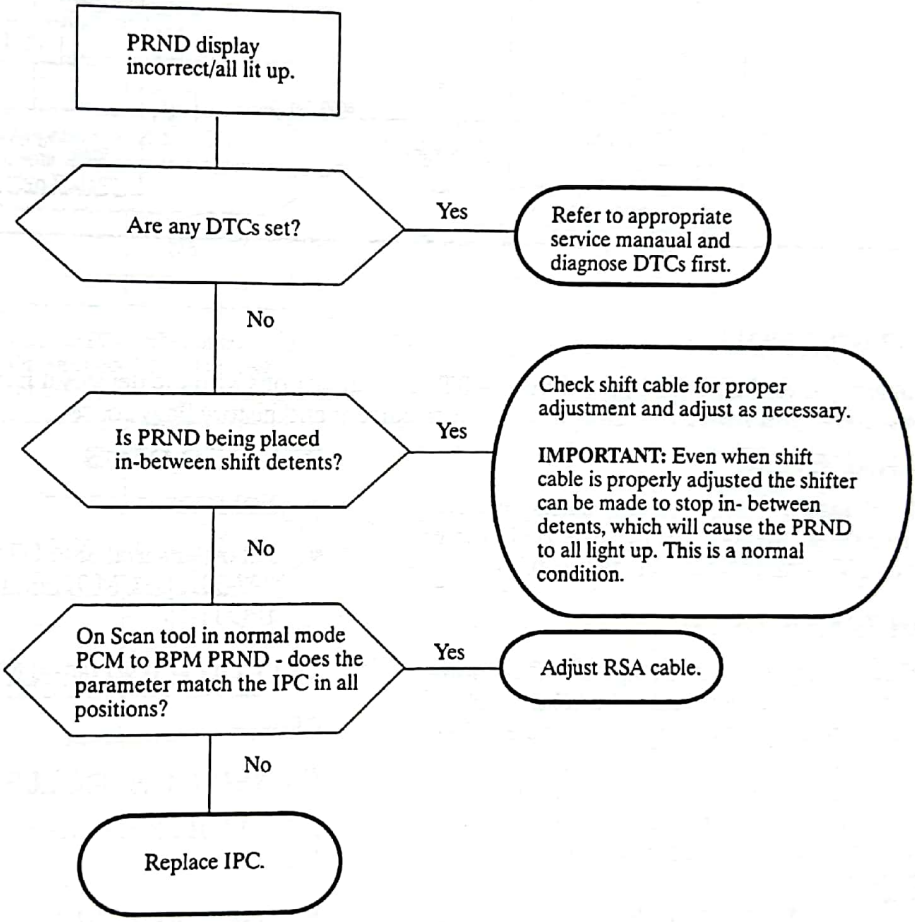
CHART 7



CamScanner

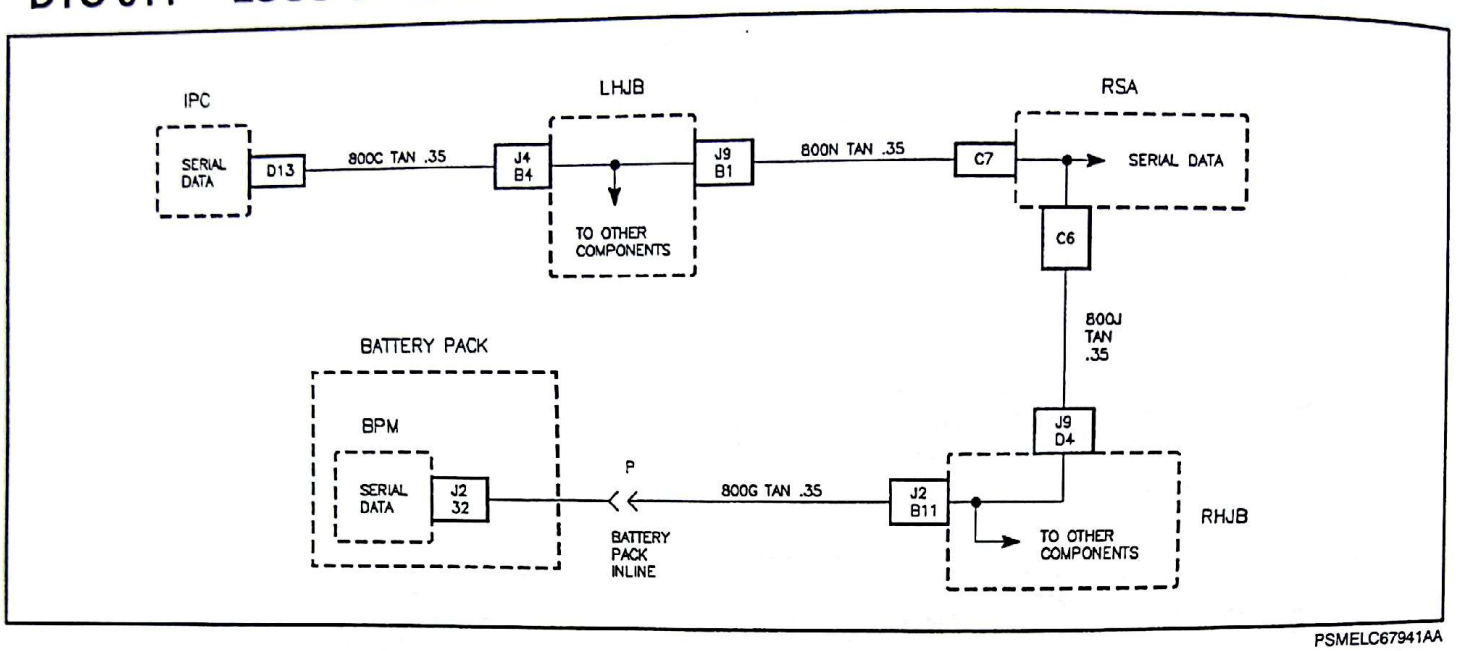
PRND DISPLAY INCORRECT/ALL LIT UP

CHART 8



DTC 011 – LOSS OF BPM POLL

IPC



PSMELC67941AA

LOSS OF BPM POLL

The instrument panel cluster (IPC) monitors UART communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the IPC loses the battery pack module (BPM) poll message for three seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY IPC

State of Charge display blank, Range ISO flashes at two Hz rate, Range display blank, CHARGE HRS ISO flashes at 2 Hz rate. If the charger is connected, then 99:99 will be displayed in the odometer section of the VF display. If the Gage toggle request button is depressed, then the alternate gage function will be displayed with the last received value and the corresponding symbol (BATTERY or POWER USE) will flash at a two Hz rate.

RELATED DTCS

- BPM 299
- All other serial data DTCs – PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15.

TELLTALE ILLUMINATED

None

OTHER CONTROLLER INTERFACES

BPM, LHJB, RHJB, RSA, SDM, HTCM, BTCM, PIM.

DIAGNOSTIC AIDS

- It is unlikely for IPC DTC 11 to set by itself.
- If DTC 11 is the only DTC set the IPC and BPM are not communicating properly with each other, but are communicating with other modules. If the BPM cannot communicate with the IPC, BPM DTC 299 should also be set.
- If only IPC DTC 11 is set it is most likely due to internal IPC fault.

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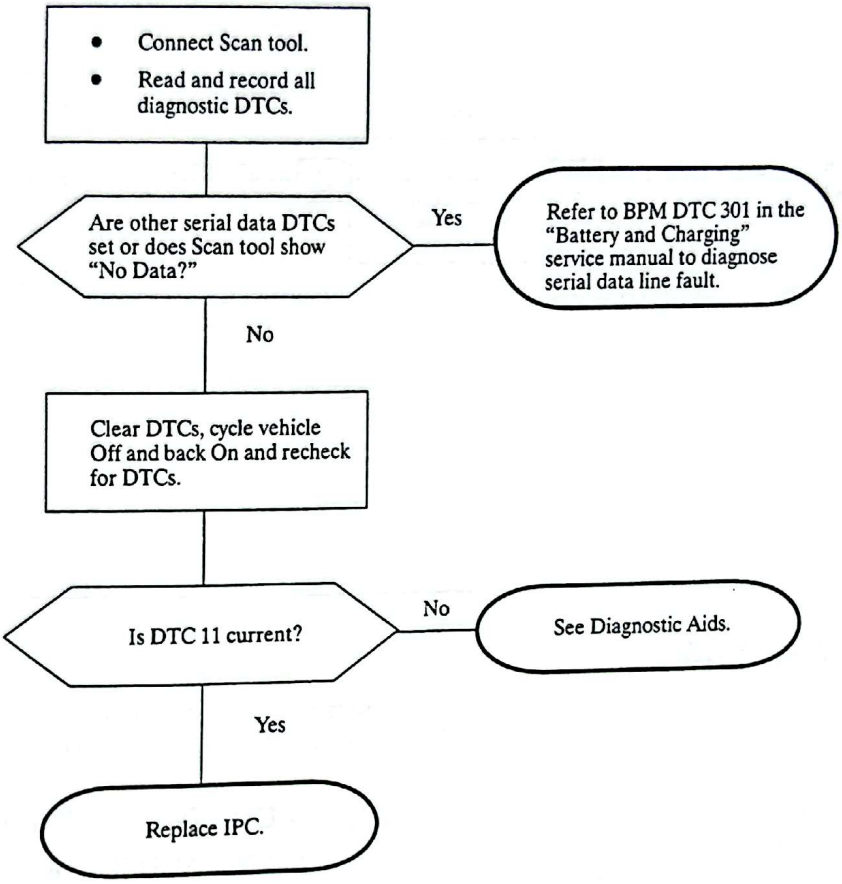
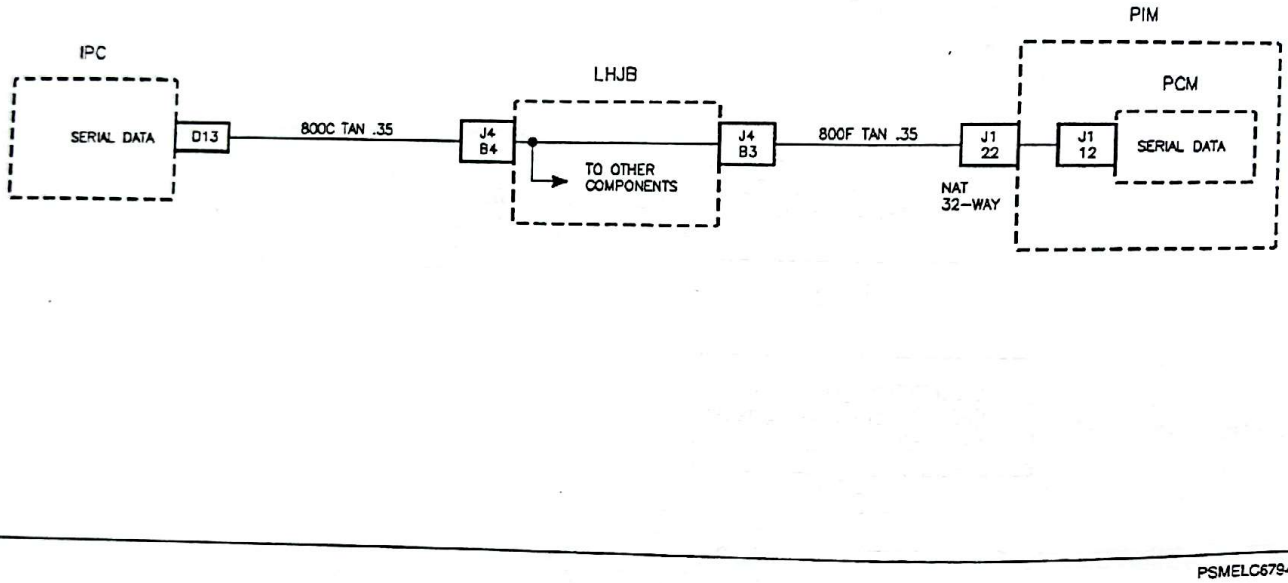
LOSS OF BPM POLL



DTC 012 – LOSS OF PCM EAVESDROP IPC



PSMELC67942AA

LOSS OF PCM EAVESDROP

The instrument panel cluster (IPC) monitors universal asynchronous receiver – transmitter (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the IPC loses the propulsion control module (PCM) eavesdrop message for three seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY THE IPC

The PRND and CHARGE HRS indicators will flash at a two Hz rate.

RELATED DTCS

All serial data line DTCs: PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15.

TELLTALE ILLUMINATED

None

OTHER CONTROLLER INTERFACES

PCM, BPM, BTCM, HTCM, RSA.

DIAGNOSTIC AIDS

- It is unlikely for IPC DTC 12 to set by itself.
- If DTC 12 is the only DTC set the IPC is not receiving the PCM messages. If the PCM were not communicating, DTCs BPM 301, HTCM 35, BTCM 72, and RSA DTC 13 should also be set.
- If these other DTCs are not set, the condition is most likely due to an internal IPC fault.

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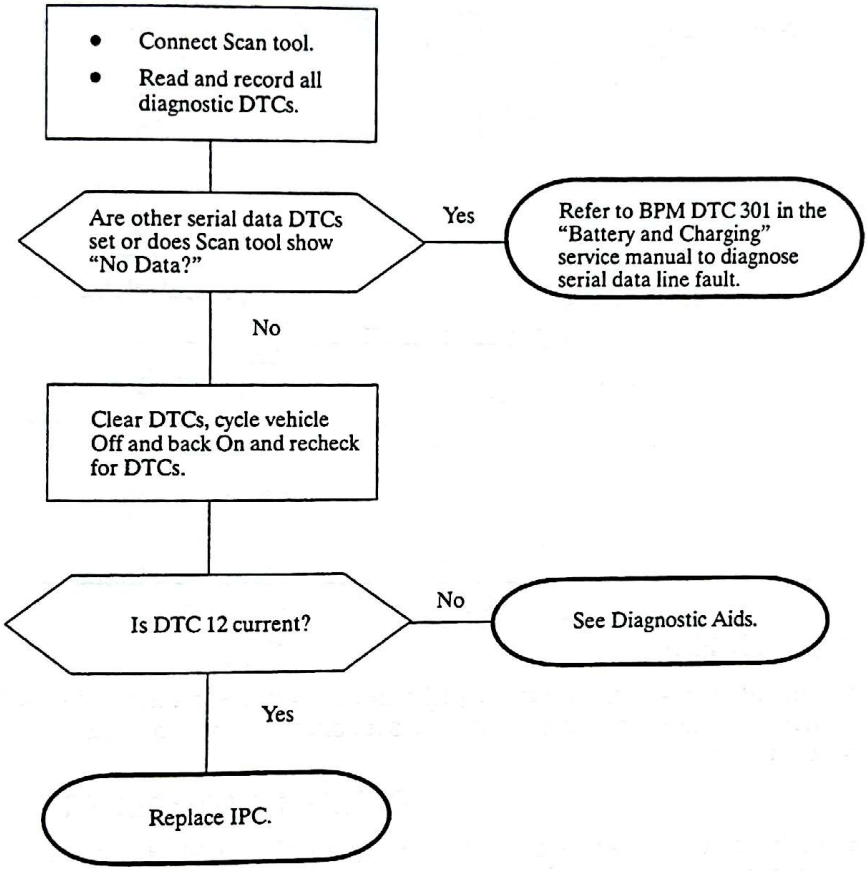
LOSS OF PCM EAVESDROP



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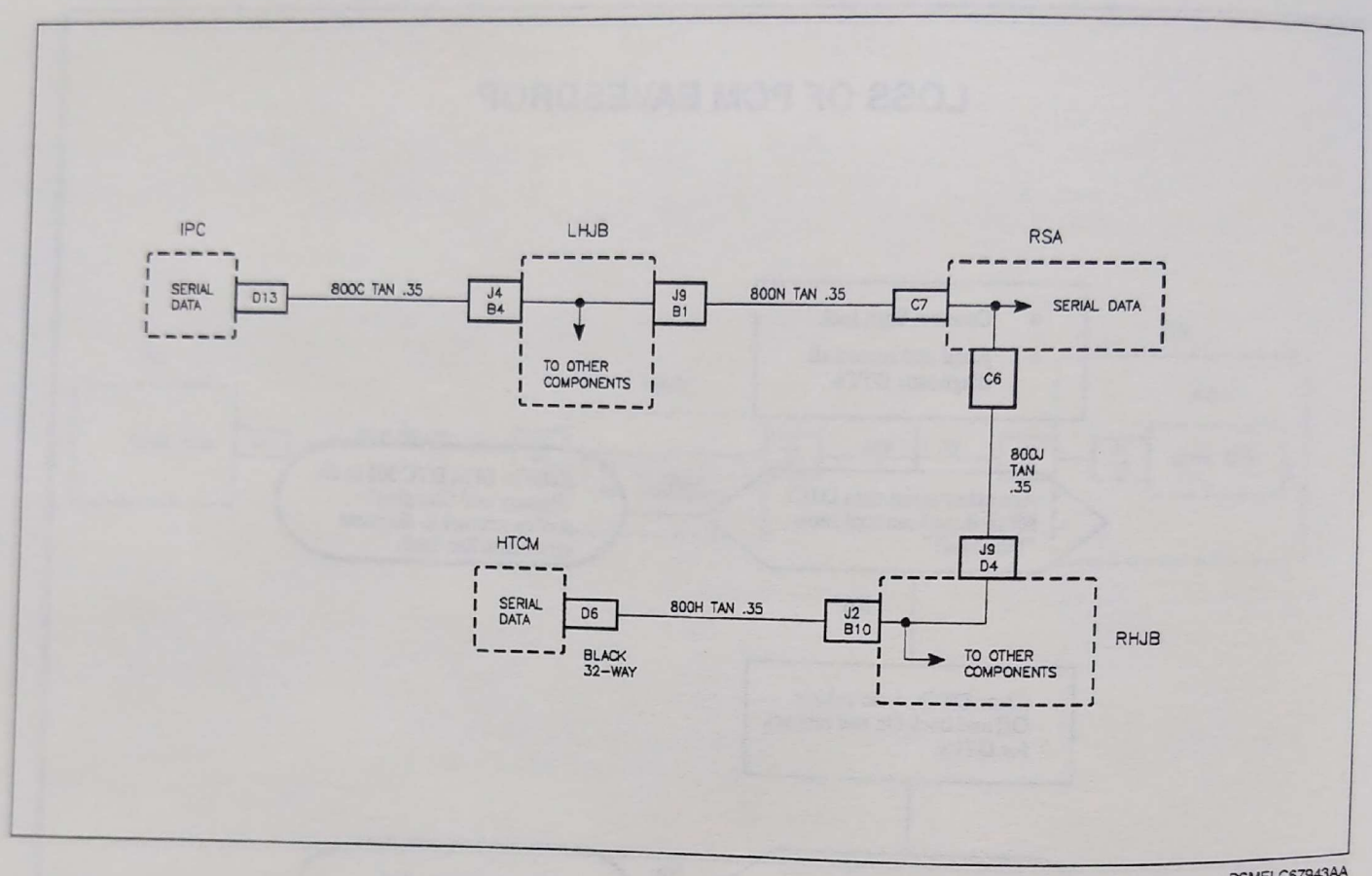
DTC 013 – LOSS OF HTCM EAVESDROP IPC



PSMELC67943AA

LOSS OF HTCM EAVESDROP

The instrument panel cluster (IPC) monitors universal asynchronous receiver – transmitter (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the IPC loses the HPVS/thermal control module (HTCM) eavesdrop message for 3 seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY THE IPC

None

RELATED DTCS

All serial data line DTCs: PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15.

TELLTALE ILLUMINATED

None

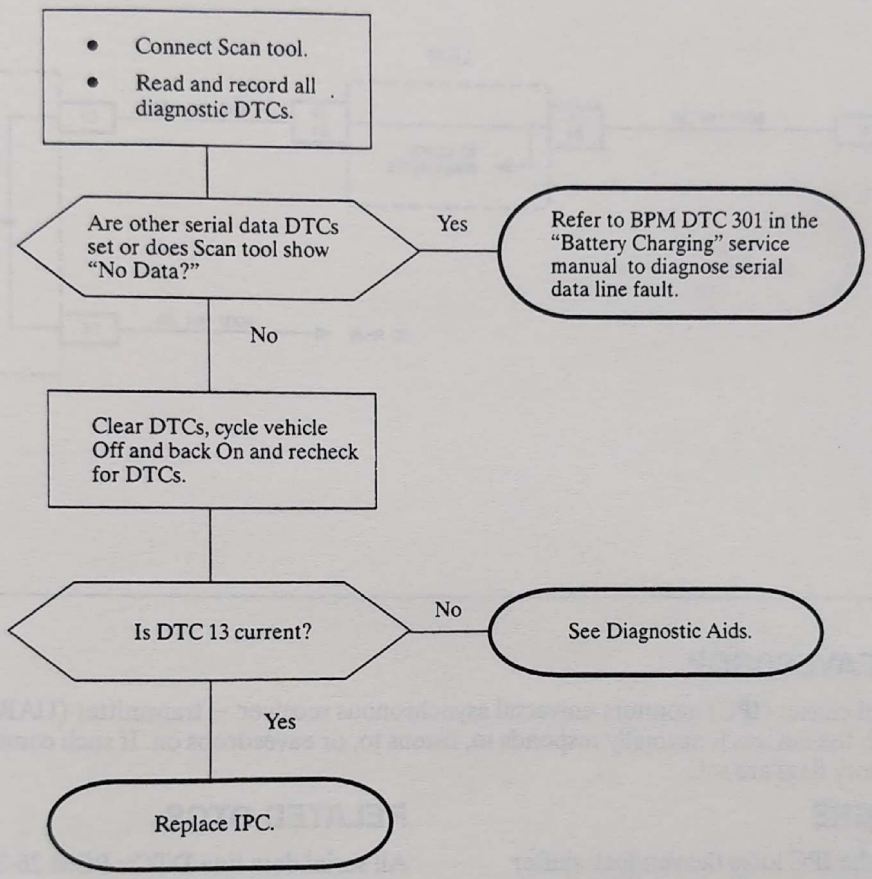
OTHER CONTROLLER INTERFACES

PCM, BPM, BTCM, HTCM, RSA.

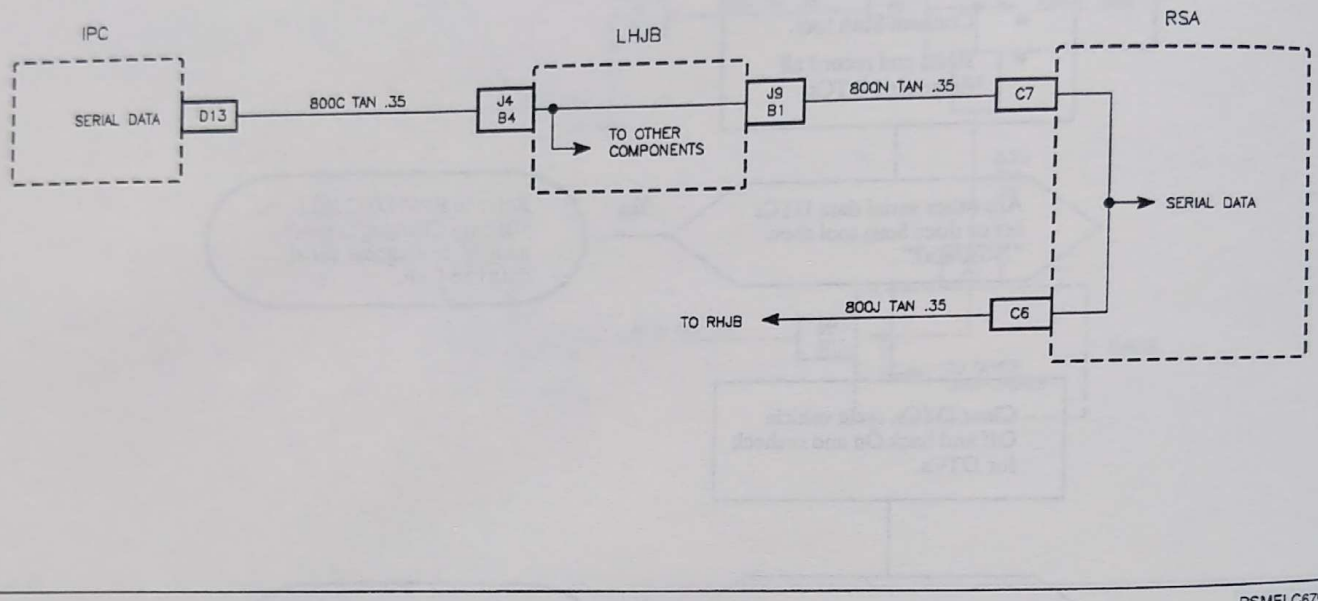
DIAGNOSTIC AIDS

- It is unlikely for IPC DTC 13 to set by itself.
- If DTC 13 is the only DTC set the IPC is not receiving the HTCM messages. If the HTCM were not communicating, BPM DTC 300, PCM DTC 29, and RSA DTC 12 should also be set.
- If these DTCs are not set, the condition is most likely due to an internal IPC fault.

LOSS OF HTCM EAVESDROP



DTC 014 – LOSS OF RSA EAVESDROP



PSMELC67944AA

LOSS OF RSA EAVESDROP

The instrument panel cluster (IPC) monitors universal asynchronous receiver – transmitter (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the IPC loses the run/lock shifter assembly (RSA) eavesdrop message for three seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY THE IPC

The AM and PM symbols in the odometer section of the display will flash at a rate of two Hz.

RELATED DTCS

All serial data line DTCs: PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15.

TELLTALE ILLUMINATED

None

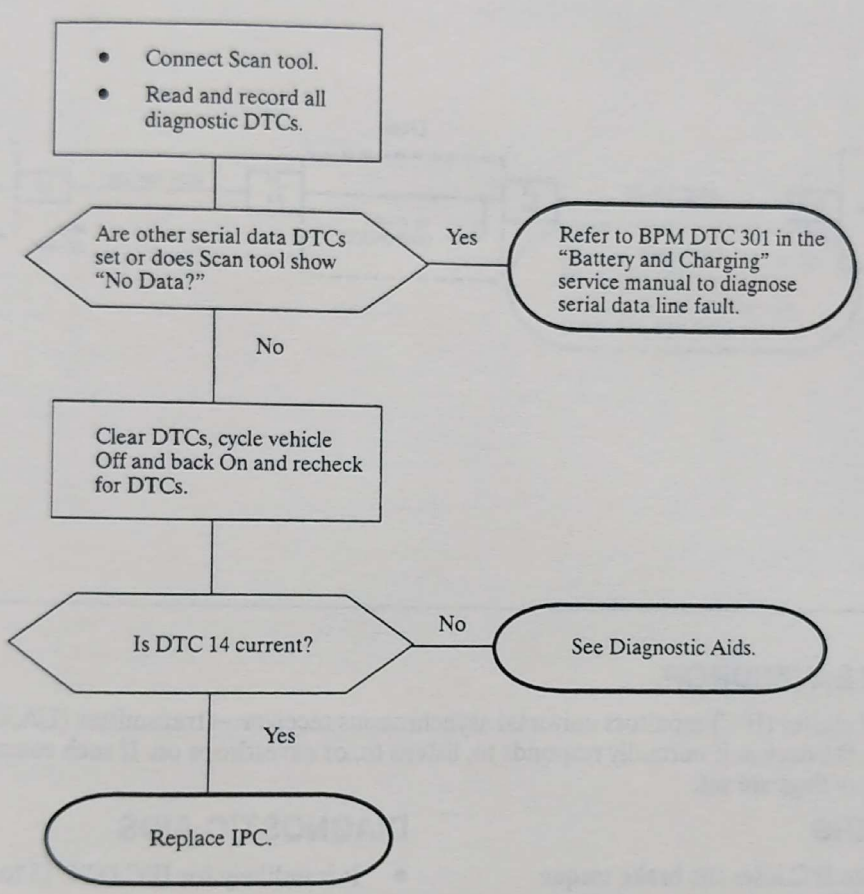
OTHER CONTROLLER INTERFACES

PCM, BPM, BTCM, HTCM, RSA.

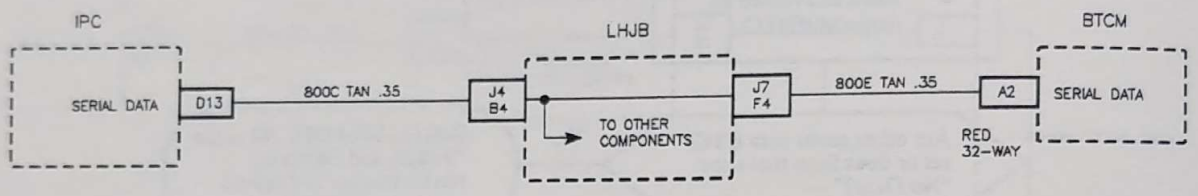
DIAGNOSTIC AIDS

- It is unlikely for IPC DTC 14 to set by itself.
- If DTC 14 is the only DTC set the IPC is not receiving the RSA messages. If the RSA were not communicating, BPM DTC 298, PCM DTC 28, and HTCM DTC 34 should also be set.
- If these other DTCs are not set, the condition is most likely due to an internal IPC fault.

LOSS OF RSA EAVESDROP



DTC 015 – LOSS OF BTCM EAVESDROP



PSMELC67945AA

LOSS OF BTCM EAVESDROP

The instrument panel cluster (IPC) monitors universal asynchronous receiver – transmitter (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the IPC loses the brake torque control module (BTCM) eavesdrop message for three seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY THE IPC

None

RELATED DTCS

All serial data line DTCs: PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15.

TELLTALE ILLUMINATED

None

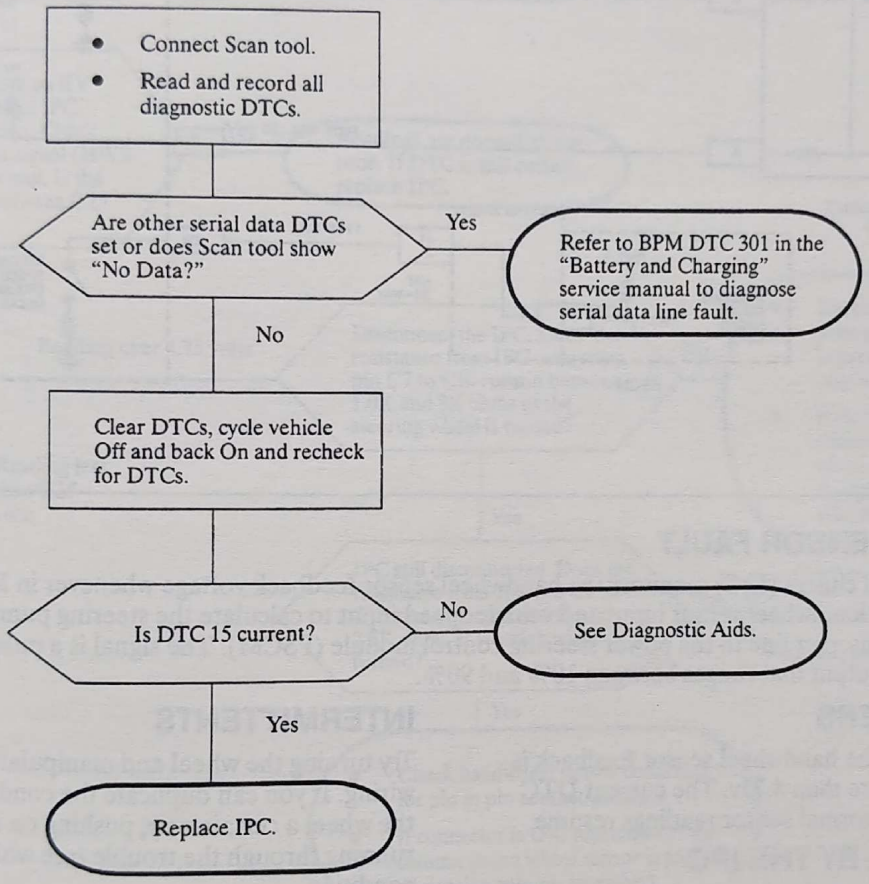
OTHER CONTROLLER INTERFACES

PCM, BPM, BTCM, HTCM, RSA.

DIAGNOSTIC AIDS

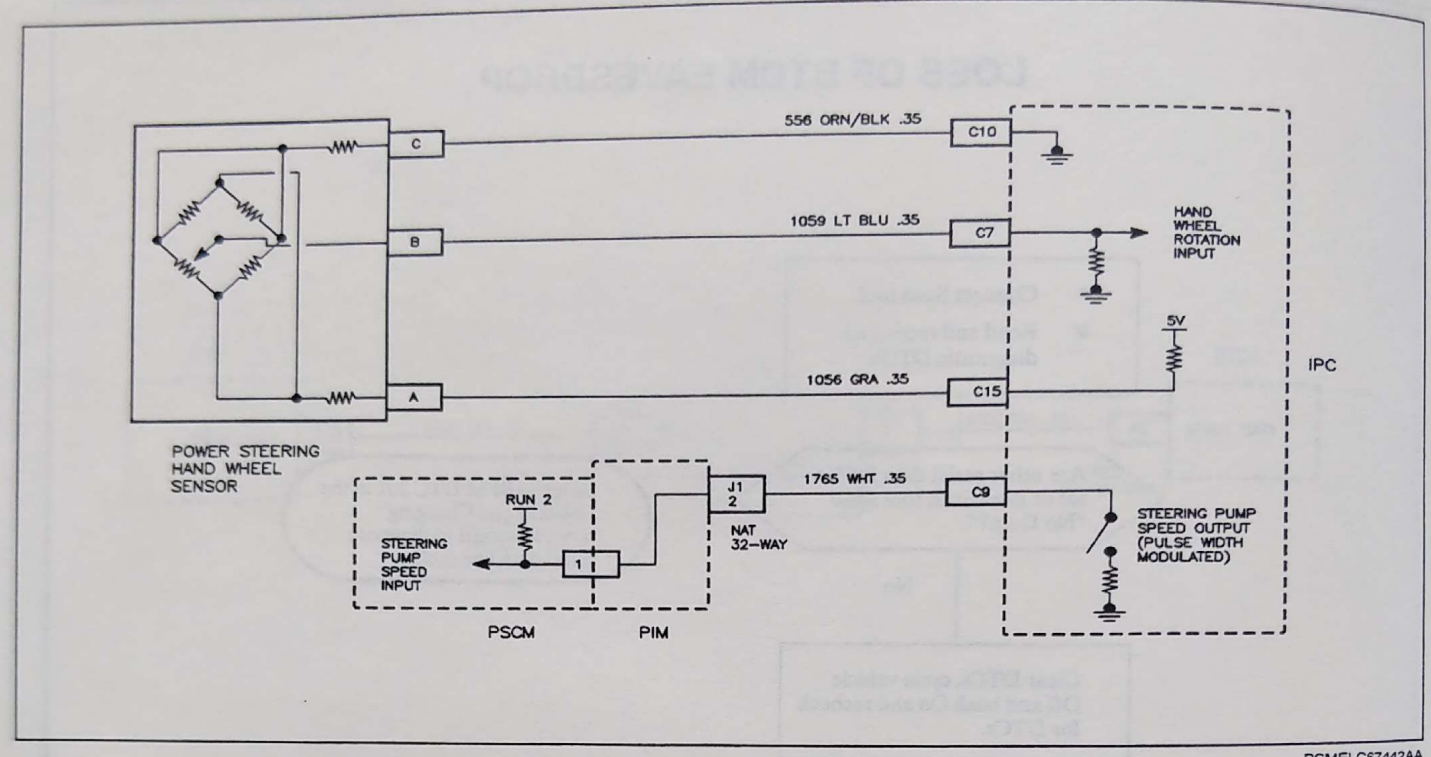
- It is unlikely for IPC DTC 15 to set by itself.
- If DTC 15 is the only DTC set the IPC is not receiving the BTCM messages. If the BTCM were not communicating, BPM DTC 297 and PCM DTC 27 should also be set.
- If these other DTCs are not set, the condition is most likely due to an internal IPC fault.

LOSS OF BTCM EAVESDROP



DTC 016 – HANDWHEEL SENSOR FAULT

IPC



PSMELC67442AA

HANDWHEEL SENSOR FAULT

The instrument panel cluster (IPC) monitors the handwheel sensor feedback voltage whenever in Run mode. It uses a combination of the handwheel sensor input and vehicle speed input to calculate the steering pump speed signal, which is sent over a discreet line to the power steering control module (PSCM). The signal is a pulse width modulated (PWM) output that ranges between 10% and 90%.

DTC PARAMETERS

This DTC will set if the handwheel sensor feedback is less than 0.25v or more than 4.75v. The current DTC will be cleared after normal sensor readings resume.

ACTION TAKEN BY THE IPC

The IPC will shift from NORMAL MODE steering operation to Fault Mode operation. In Fault Mode the steering pump control is based on vehicle speed without considering the handwheel sensor inputs per the chart below. The IPC will return to NORMAL MODE when normal handwheel sensor readings resume. Refer to IPC commanded steering pump speed for normal operation.

RELATED DTCS

None

TELLTALE ILLUMINATED

None

OTHER CONTROLLER INTERFACES

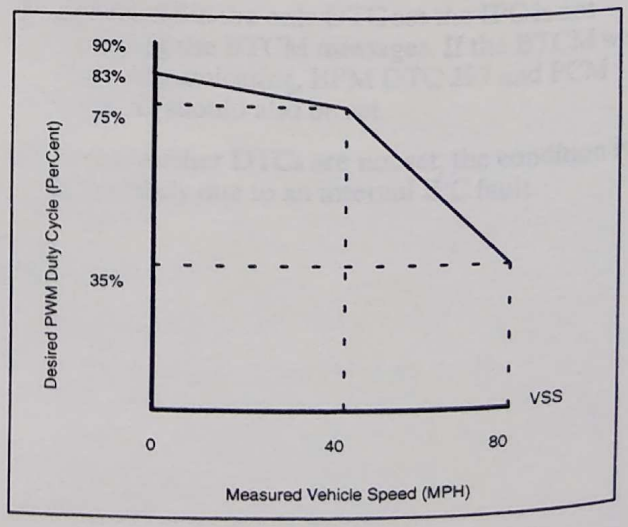
PSCM

DIAGNOSTIC AIDS

If no handwheel feedback changes are detected for four seconds, the steering command PWM is set to 48% until an input is detected. If the charge paddle is in the charge port, the PWM is set to 20%. Less than 10% and greater than 90% duty cycle from the IPC are fault levels and the PSCM defaults to 48% output.

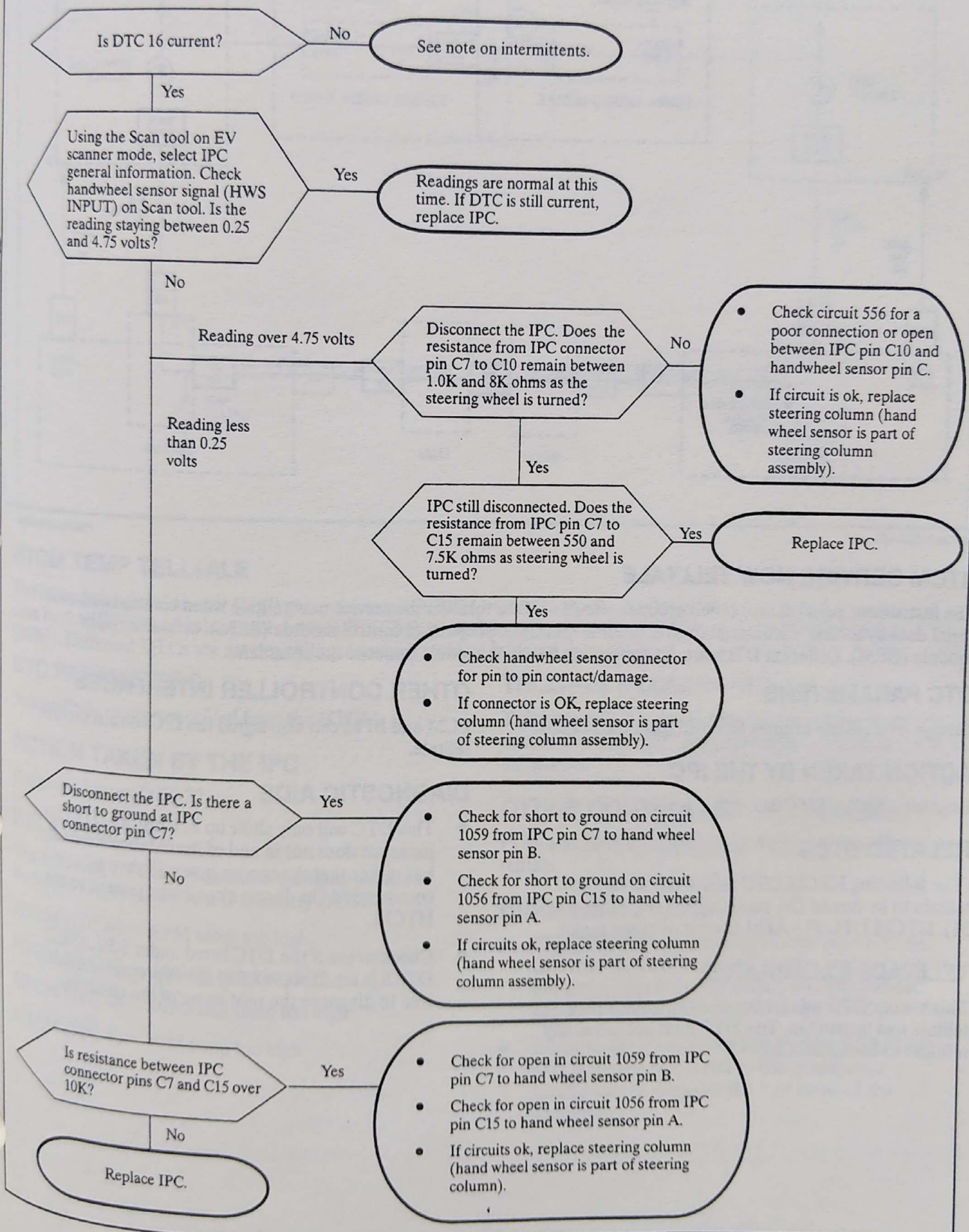
INTERMITTENTS

Try turning the wheel and manipulating connectors and wiring. If you can duplicate the condition by turning the wheel a certain way, pushing on a harness, etc., try running through the trouble tree while duplicating the condition.



Measured Vehicle Speed (MPH)
vs
Desired PWM Duty Cycle in Fault Mode.

HANDWHEEL SENSOR FAULT
DTC 16



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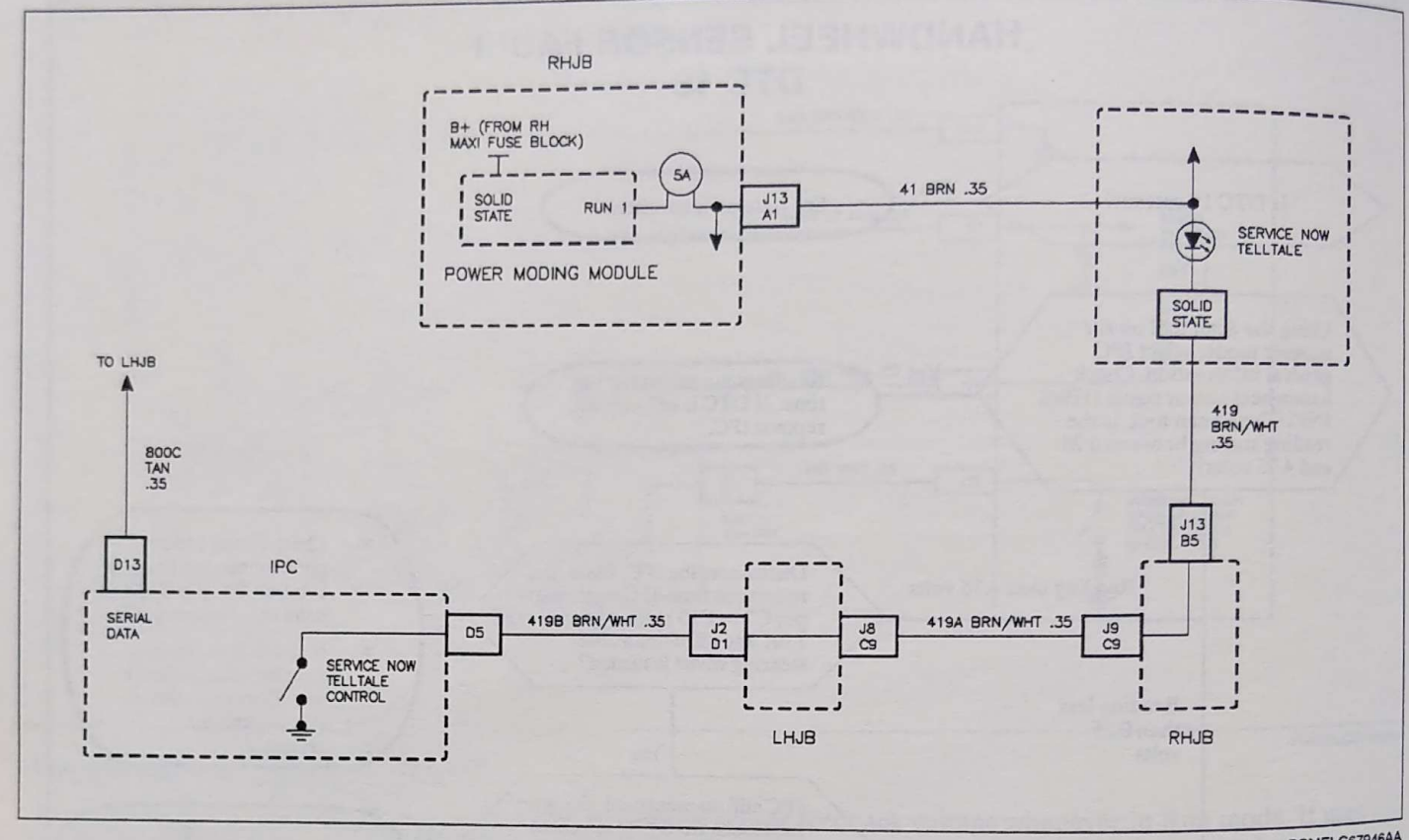
DTC 31 – HTCM SERVICE NOW TELLTALE IPC



PSMELC67946AA

HTCM SERVICE NOW TELLTALE

The instrument panel cluster (IPC) grounds circuit 419B to turn On the service now telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Service now telltale request received from the HTCM.

ACTION TAKEN BY THE IPC

Register a history DTC 31.

RELATED DTCS

(The following HTCM DTC causes the service now telltale to be turned On, resulting in a IPC history DTC 31). HTCM DTC 37 - APM 12v out of range major.

TELLTALE ILLUMINATED

This history DTC was set because the service now telltale was turned On. This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

PCM and BPM can also signal the IPC to turn on this telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the service now telltale was commanded On due to a condition related to the HTCM.
- Check to see if the DTC listed under RELATED DTCS is set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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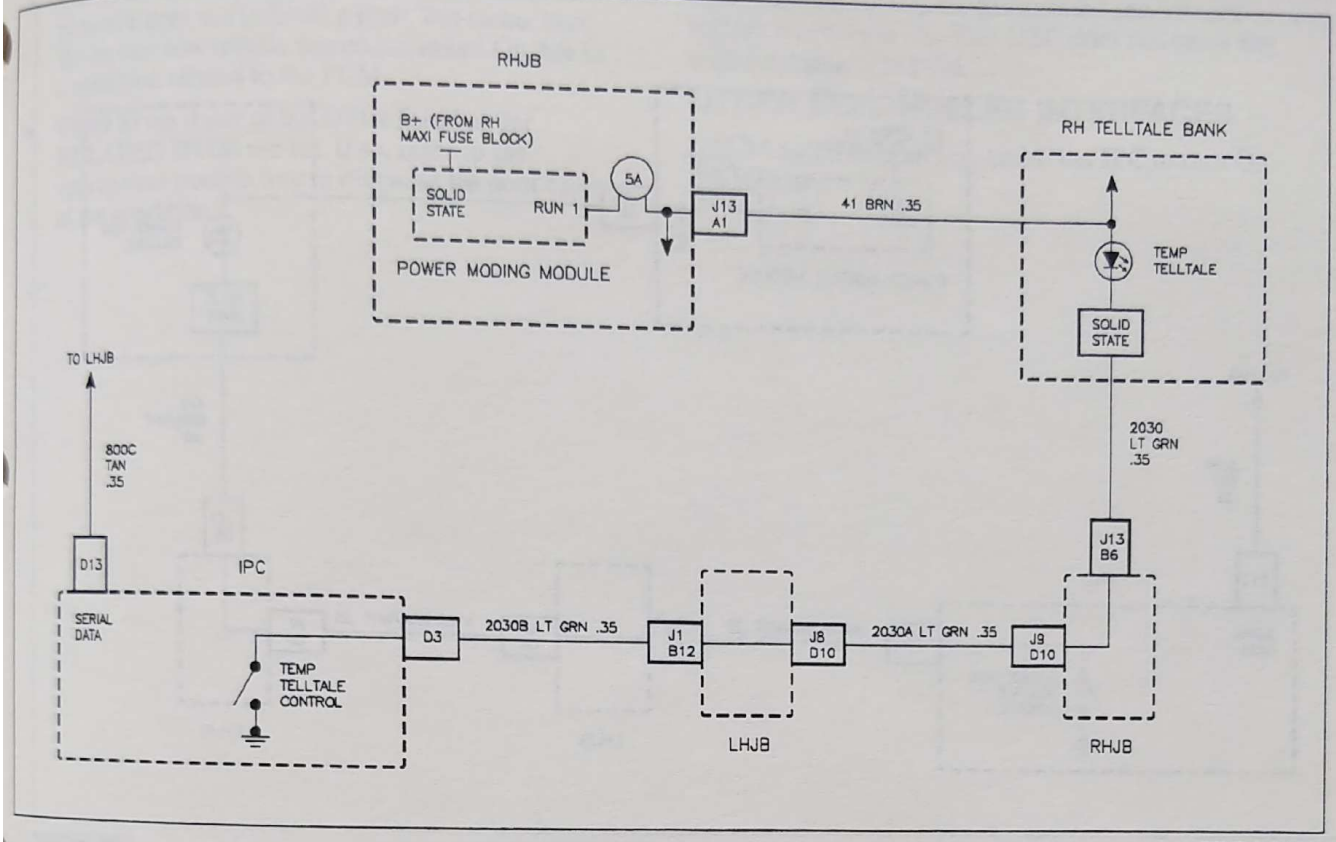
DTC 032 – HTCM TEMP TELLTALE

IPC



PSMELC67947AA

HTCM TEMP TELLTALE

The instrument panel cluster (IPC) grounds circuit 2030B to turn On the temp telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Temp telltale request received from the HTCM.

ACTION TAKEN BY THE IPC

Register a history DTC 32.

RELATED DTCS

The following HTCM DTCs cause the temp telltale to be turned On, resulting in a IPC history DTC 32

HTCM DTC 46 – APM temp too high

HTCM DTC 47 – Coolant temp too high

HTCM DTC 48 – Drive unit temp too high

HTCM DTC 49 – PIM temp too high

TELLTALE ILLUMINATED

This history DTC was set because the temp telltale was turned On. This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

PCM and BPM can also signal the IPC to turn On this telltale

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the temp telltale was commanded On due to a condition related to the HTCM.
- Check to see if any DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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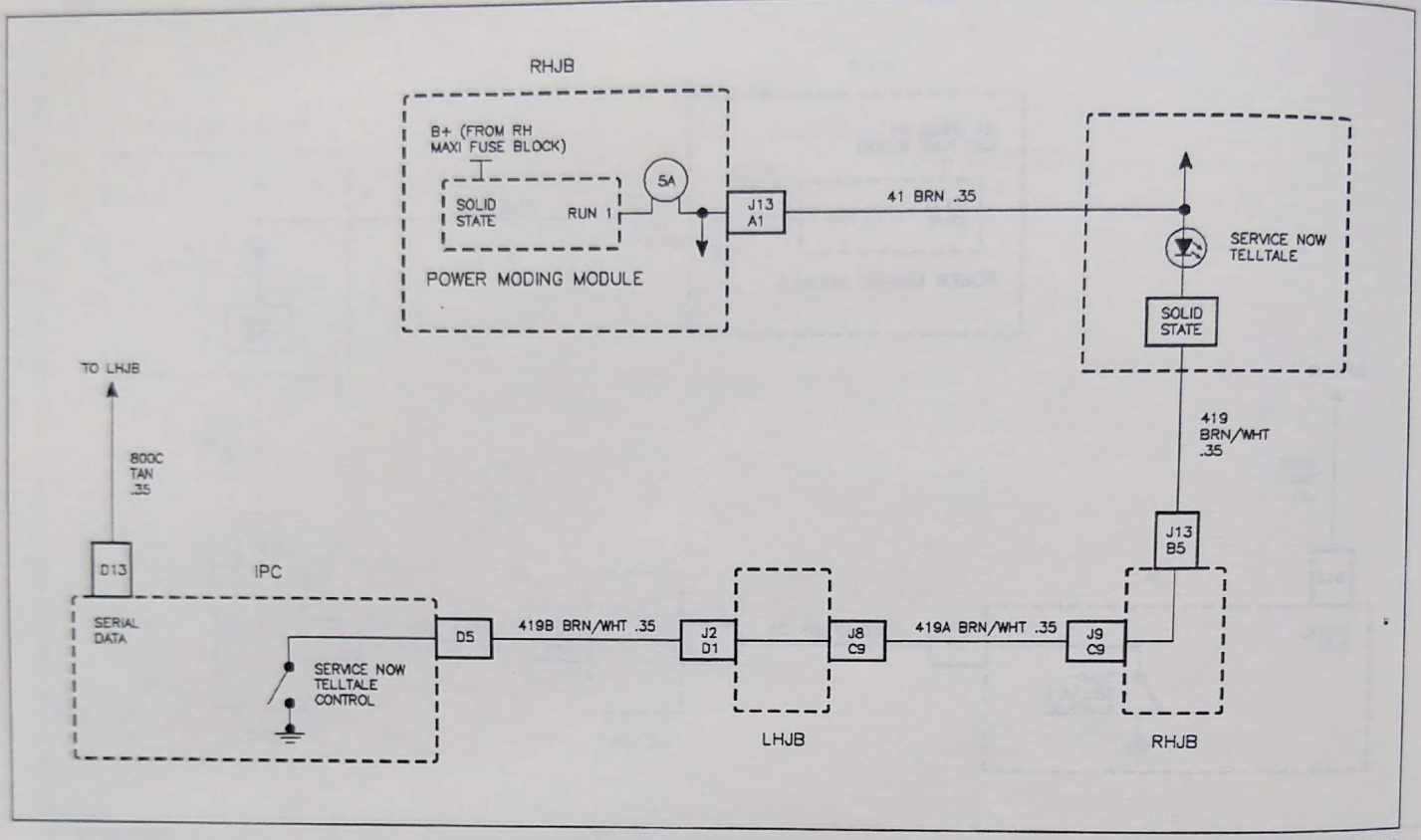
DTC 033 – PCM SERVICE NOW TELLTALE IPC



PSMELC67946AA

PCM SERVICE NOW TELLTALE

The instrument panel cluster (IPC) grounds circuit 419B to turn On the service now telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Temp telltale request received from the HTCM.

ACTION TAKEN BY THE IPC

Register a history DTC 33

RELATED DTCS

The following PCM DTCs cause the service now telltale to be turned On, resulting in a IPC history DTC 33

PCM:

- Pack voltage sensed low (05) or high (06) in power inverter module (PIM).
- Input vehicle speed pulse rate too high (07).
- Invalid zero vehicle speed detected (09).
- No oil pressure sensed after oil pump commanded On (32).
- Bias control module (BCA) critical fault (43).
- BCA non-critical (speed and direction sensor) fault (44).
- BCA bias fault (45).
- Phase current exceeds command (52).
- Auxiliary battery voltage low (59) or high (60).
- PRND input ≠ valid combination for 60 seconds (61).
- Phase current feedback failed powerup test (69).
- Pack voltage sensed low (71) or high (72) in PIM at powerup.
- Excessive shaft speed variation detected (74).
- BCA speed and direction sensor fault (76).
- PCM reads shaft speed = 0, but BTCM reads > 5 mph (78).
- Shaft direction input changed while vehicle was moving (79).
- Shaft speed was > 12 mph and then suddenly dropped to 0 (80).
- BCA fault: phase 1 (81), phase 2 (82), or phase 3 (83).
- BCA overvoltage (84) or undervoltage (85) fault.
- BCA slip diagnostic fault (87).
- BCA current command diagnostic fault (88).
- BCA failed fwd (89) or rev (90) Slip Direction test @ powerup.
- Aux battery not charging (104).

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DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not indicate a fault, but rather that the service now telltale was commanded On due to a condition related to the PCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

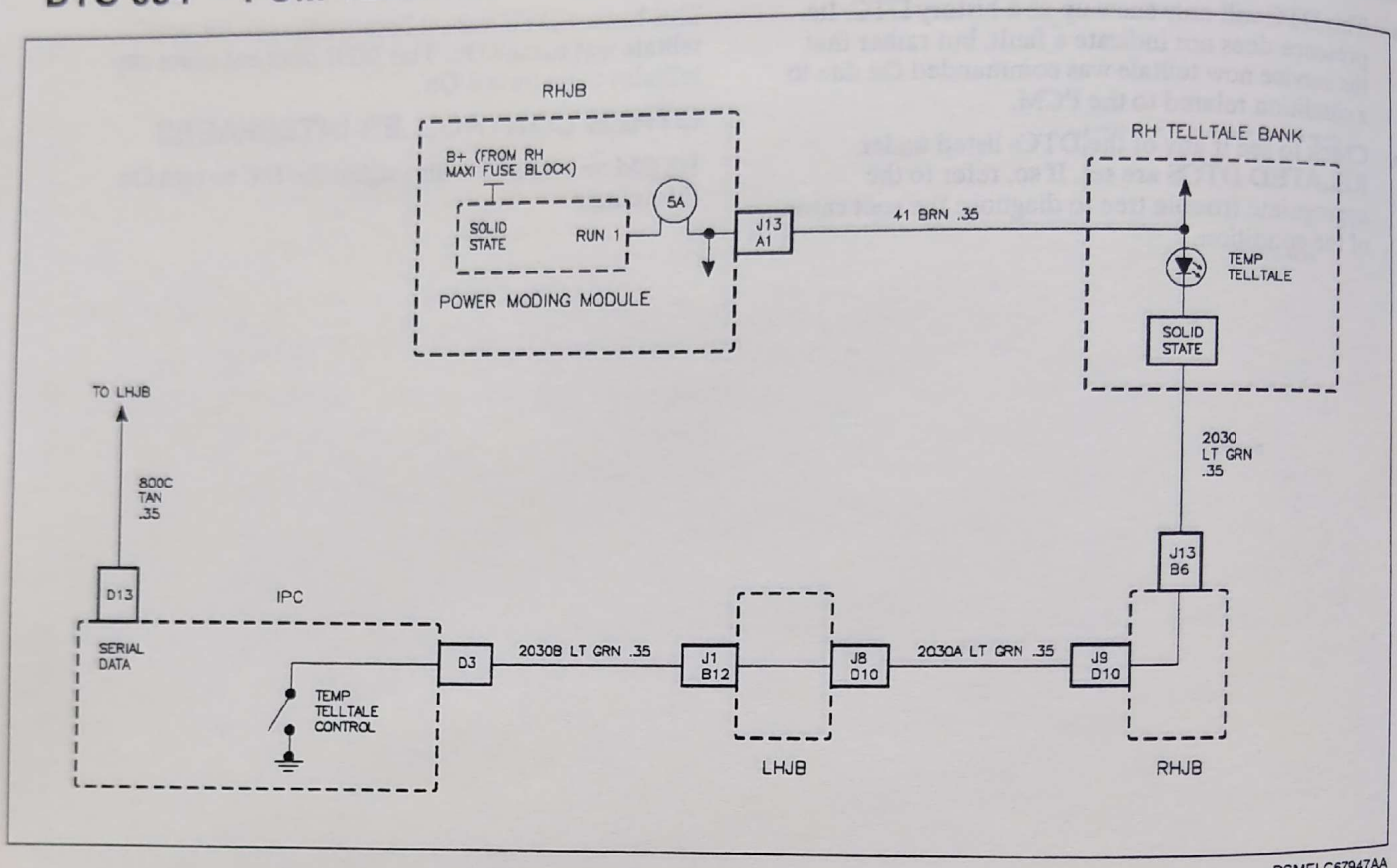
TELLTALE ILLUMINATED

This history DTC was set because the service now telltale was turned On. This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

HTCM and BPM can also signal the IPC to turn On this telltale.

DTC 034 – PCM TEMP TELLTALE



PSMELC67947AA

PCM TEMP TELLTALE

The instrument panel cluster (IPC) grounds circuit 2030B to turn On the temp telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Temp telltale request received from the PCM.

ACTION TAKEN BY THE IPC

Register a history DTC 34

RELATED DTCS

The following PCM DTCs cause the temp telltale to be turned On, resulting in a IPC history DTC 34:

- PCM DTC 34 – PEB overheat condition
- PCM DTC 36 – Motor temp exceeds 175°C or PEB temp exceeds 74°C.
- PCM DTC 37 – Propulsion motor winding overheat condition.

TELLTALE ILLUMINATED

This history DTC was set because the temp telltale was turned On.

This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

HTCM and BPM can also signal the IPC to turn On this telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the Temp telltale was commanded On due to a condition related to the PCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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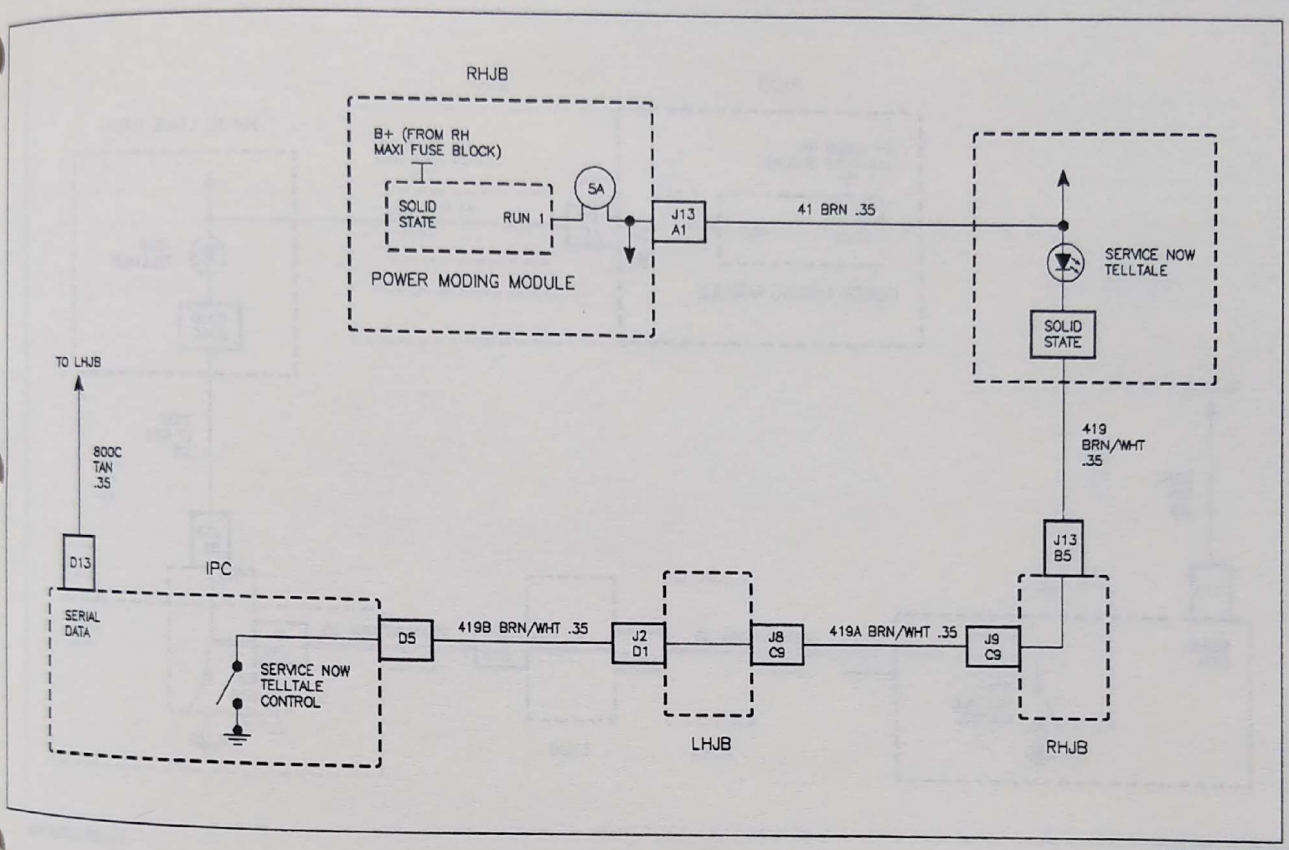
DTC 035 – BPM SERVICE NOW TELLTALE IPC



PSMELC67946AA

BPM SERVICE NOW TELLTALE

The instrument panel cluster (IPC) grounds circuit 419B to turn On the service now telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Service now telltale request received from the BPM.

ACTION TAKEN BY THE IPC

Register a history DTC 35

RELATED DTCS

The following BPM DTCs cause the service now telltale to be turned On, resulting in a IPC history DTC 35:

- BPM DTCs 6, 14, 22, 30, 38, and so on up to 214 – Severe undervoltage modules (one or more)
- BPM DTCs 7, 15, 23, 31, 39, and so on up to 215 – Severe overvoltage modules (one or more)
- BPM DTC 221 – Severe undervoltage pack detected
- BPM DTC 222 – Severe overvoltage pack detected
- BPM DTC 231 – Severe low USOC detected

TELLTALE ILLUMINATED

This history DTC was set because the service now telltale was turned On.

This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

HTCM and PCM can also signal the IPC to turn On this telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the service now telltale was commanded On due to a condition related to the BPM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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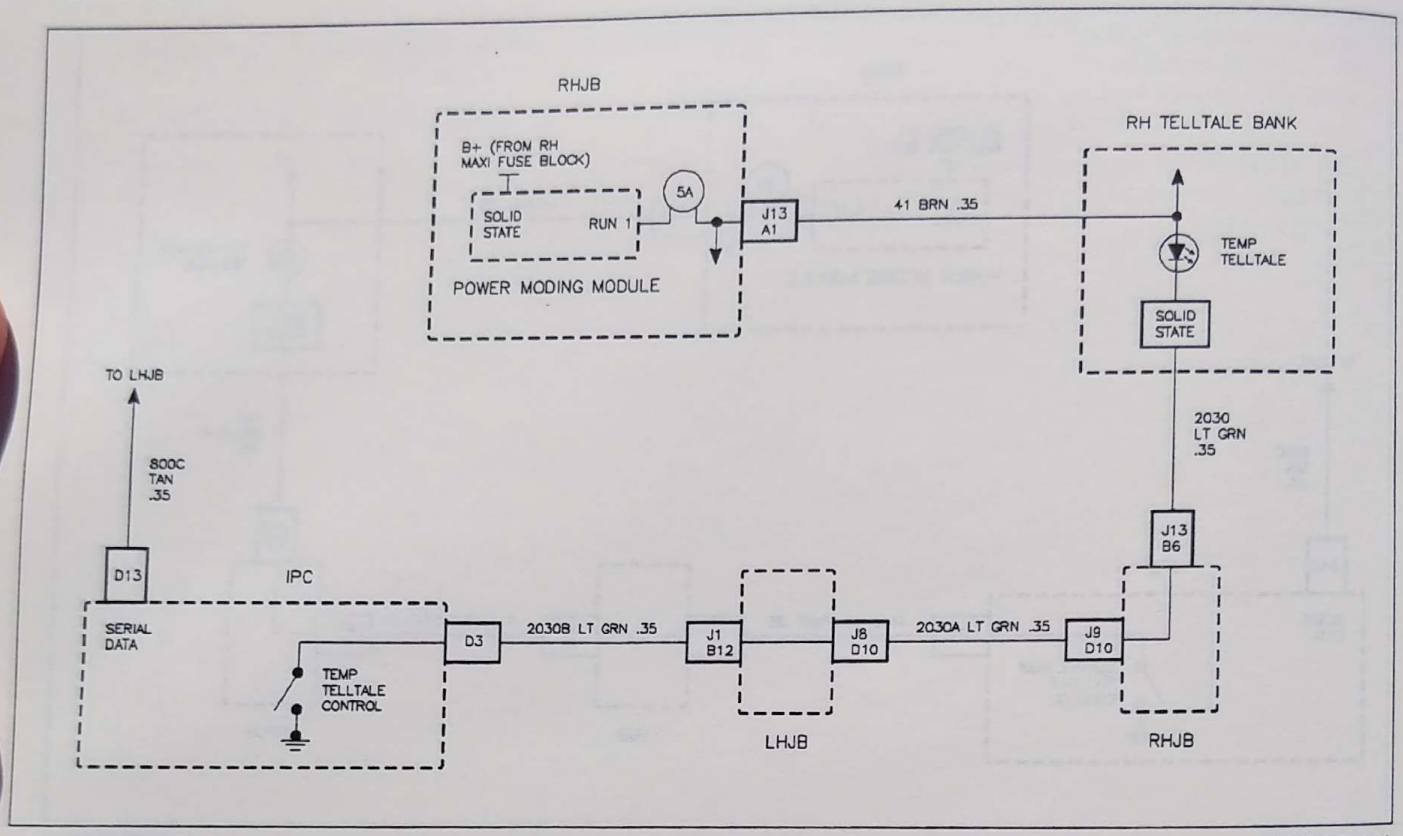
DTC 036 – BPM TEMP TELLTALE

IPC



PSMELC67947AA

BPM TEMP TELLTALE

The instrument panel cluster (IPC) grounds circuit 2030B to turn On the temp telltale when commanded over serial data by the HPVS/thermal control module (HTCM), propulsion control module (PCM), or battery pack module (BPM). Different DTCs are set depending on which module initiated the command.

DTC PARAMETERS

Temp telltale request received from the BPM.

ACTION TAKEN BY THE IPC

Register a history DTC 36

RELATED DTCS

The following BPM DTCs cause the temp telltale to be turned On, resulting in a IPC history DTC 36:

- BPM DTC 269 – Propel overtemp fault
- BPM DTC 270 – Charge overtemp fault
- BPM DTC 288 – CP overtemp fault

TELLTALE ILLUMINATED

This history DTC was set because the temp telltale was turned On.

This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

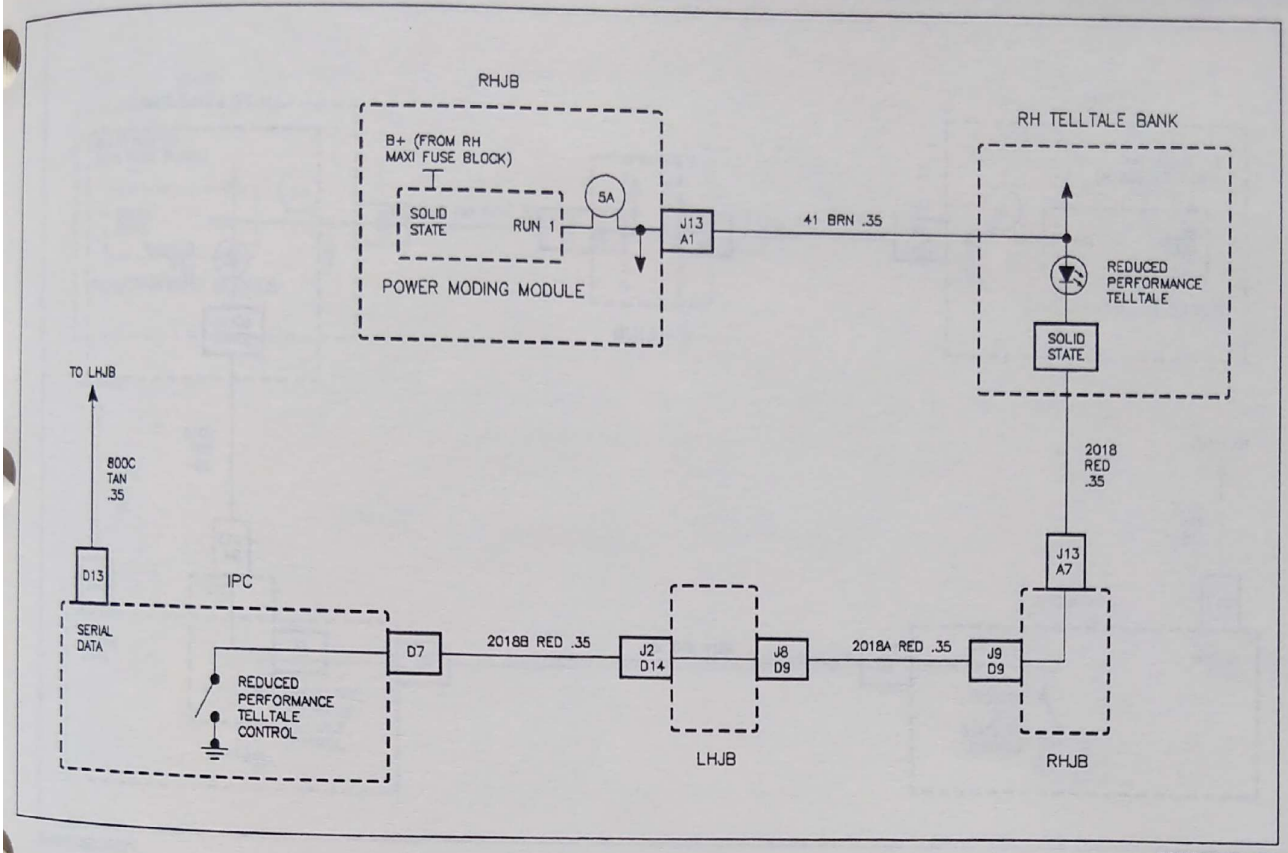
HTCM and PCM can also signal the IPC to turn On this telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the temp telltale was commanded On due to a condition related to the BPM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

CamScanner

DTC 037 – REDUCED PERFORMANCE TELLTALE IPC



PSMELC67948AA

REDUCED PERFORMANCE TELLTALE

The instrument panel cluster (IPC) grounds circuit 2018 to turn on the reduced performance telltale when commanded over serial data by the propulsion control module (PCM).

DTC PARAMETERS

Reduced performance telltale request received from the PCM.

ACTION TAKEN BY THE IPC

Register a history DTC 37

Initiates a single chime and Check Messages warning.

RELATED DTCS

The following PCM DTCs cause the reduced performance telltale to be turned On, resulting in a IPC history DTC 37:

- PCM DTC 32 – No oil pressure sensed after oil pump commanded on.
- PCM DTC 36 – Motor temperature exceeds 175°C or PEB exceeds 74°C
- PCM DTC 53 – Low battery power output capability detected
- PCM DTC 102 – Reduced Perf mode enabled due to request from BPM

TELLTALE ILLUMINATED

This history DTC was set because the reduced performance telltale was turned On.

This DTC does not cause any telltales to be turned On.

OTHER CONTROLLER INTERFACES

IPC sounds the chime each time the Check Messages warning comes on.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the reduced performance telltale was commanded On due to a condition related to the PCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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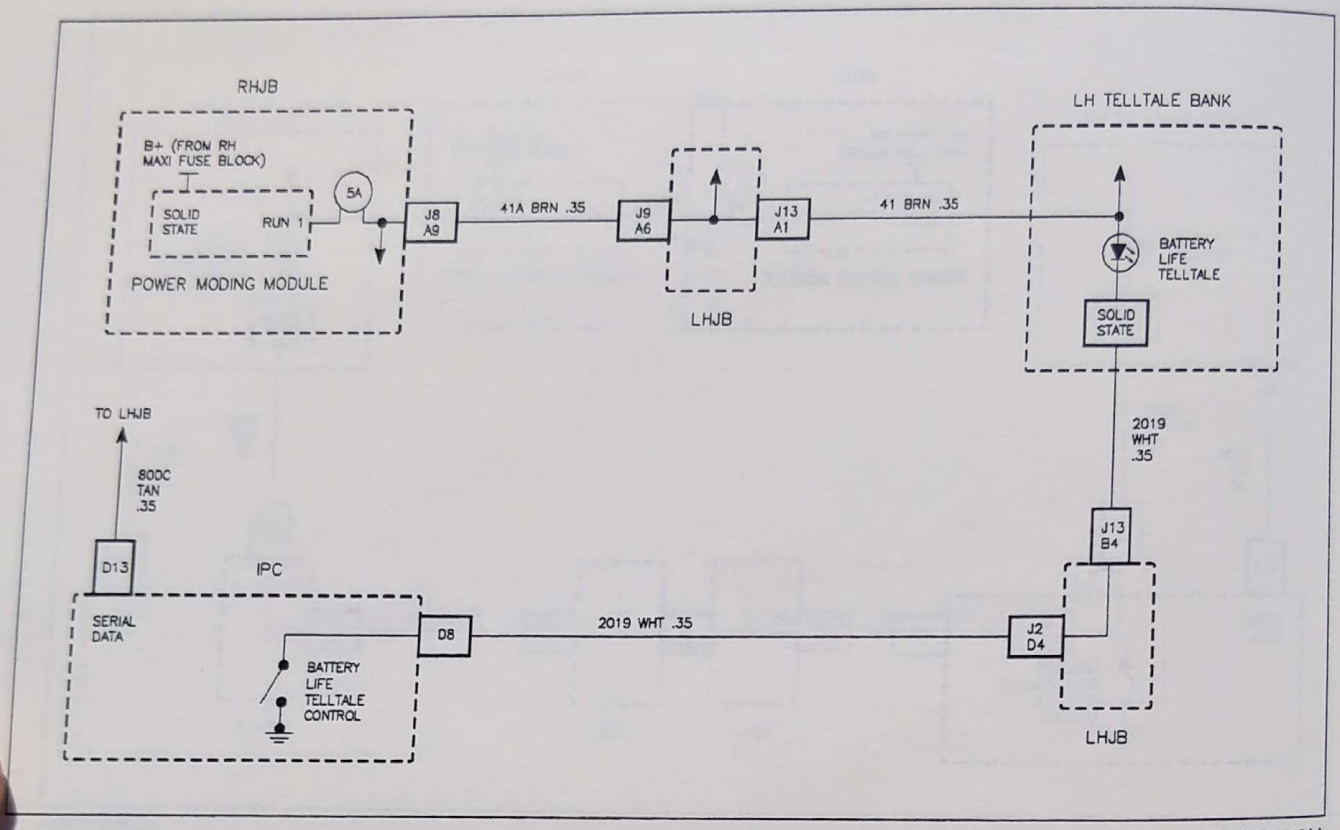
DTC 038 – BATTERY LIFE TELLTALE IPC



PSMELC67949AA

BATTERY LIFE TELLTALE

The instrument panel cluster (IPC) grounds circuit 2019 to turn On the battery life telltale when commanded over serial data by the battery pack module (BPM).

DTC PARAMETERS

Battery Life telltale request received from the BPM.

ACTION TAKEN BY THE IPC

Register a history DTC 38

Initiates a single chime and Check Messages warning

RELATED DTCS

The following BPM DTCs cause the battery life telltale to be turned On, resulting in a IPC history DTC 38:

- *BPM DTCs 5, 13, 21, 29, and so on up to 213 – Undervoltage modules detected.*
- *BPM DTC 220 – Undervoltage pack detected*
- *BPM DTC 230 – Low USOC detected*

TELLTALE ILLUMINATED

This history DTC was set because the battery life telltale was turned On.

Check Messages warning on IPC comes on for seven seconds every five minutes.

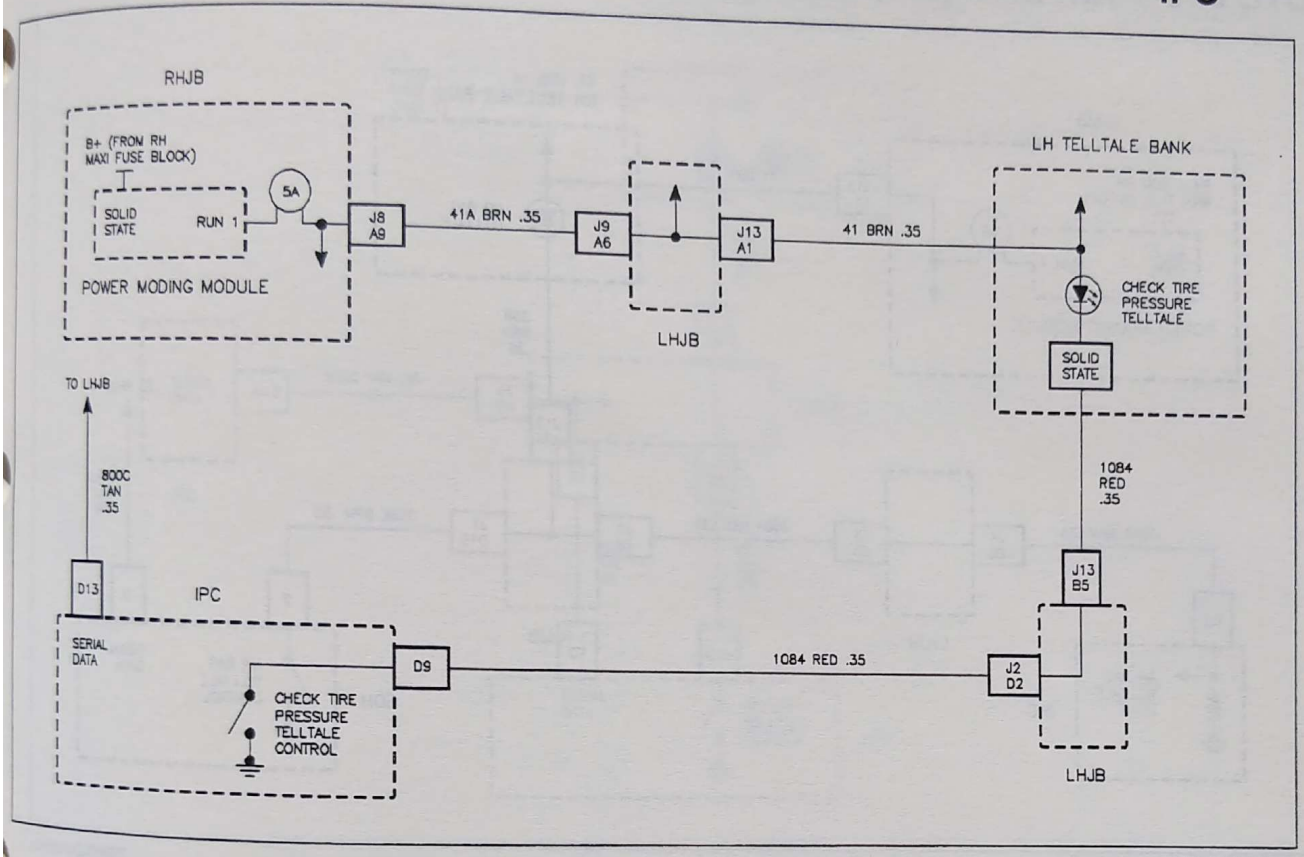
OTHER CONTROLLER INTERFACES

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the battery life telltale was commanded On due to a condition related to the BPM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

DTC 039 – CHECK TIRE PRESSURE TELLTALE

IPC



PSMELC67950AA

CHECK TIRE PRESSURE TELLTALE

The instrument panel cluster (IPC) grounds circuit 1084 to turn On the check tire pressure telltale when commanded over serial data by the run/lock shifter assembly (RSA).

DTC PARAMETERS

check tire pressure telltale request received from the RSA.

ACTION TAKEN BY THE IPC

- Registers a history DTC 39.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

RSA DTC 23.

TELLTALE ILLUMINATED

This history DTC was set because the check tire pressure telltale was turned On.

Check Messages warning comes on IPC comes on for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the check tire pressure telltale was commanded On due to a tire pressure condition indicated by the RSA.
- Check to see if the DTC listed under Related DTCs is set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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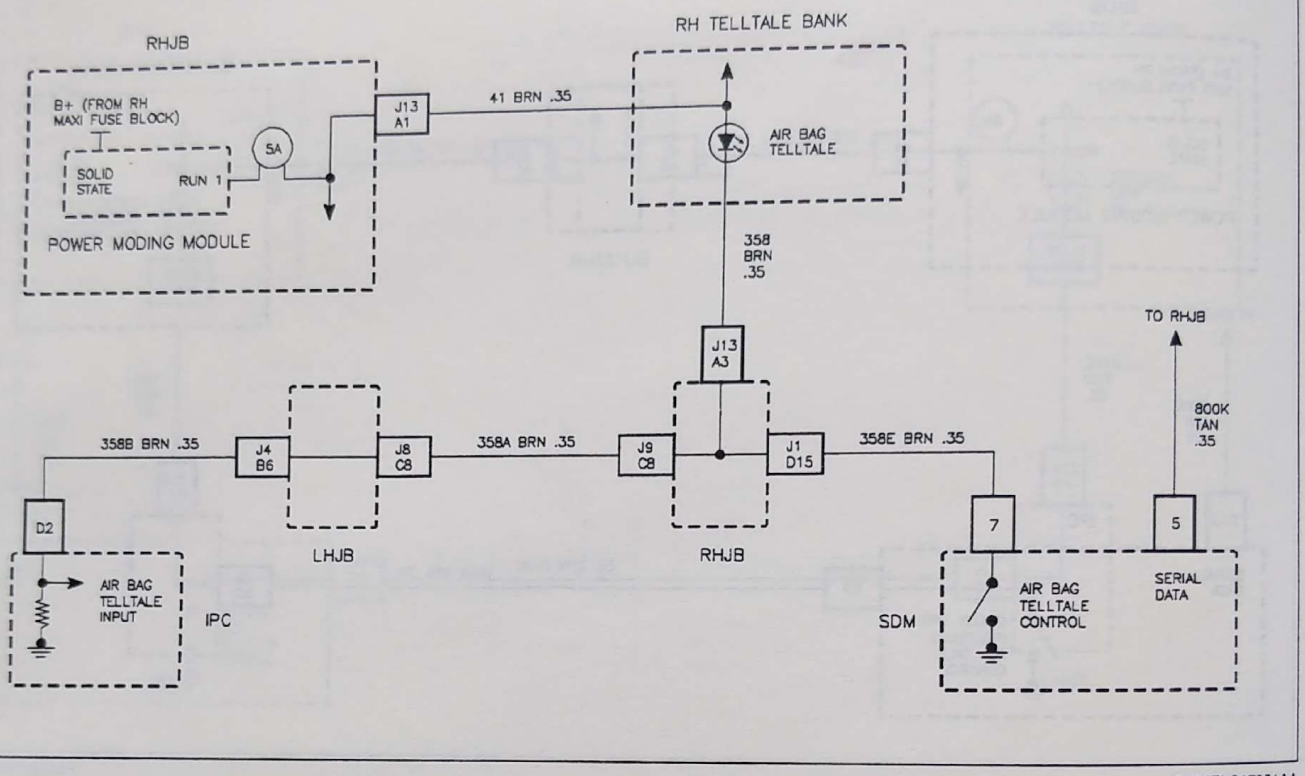
DTC 040 – AIR BAG (SIR) TELLTALE



PSMELC67951AA

AIR BAG (SIR) TELLTALE

The sensor diagnostic (SDM) grounds circuit 358 to turn On the air bag telltale. The instrument panel cluster (IPC) monitors circuit 358 to determine if the telltale is On.

DTC PARAMETERS

Air bag telltale circuit 358 grounded

ACTION TAKEN BY THE IPC

- Registers a history DTC 40.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

All SIR DTCs

TELLTALE ILLUMINATED

This history DTC was set because the air bag telltale was turned On.

Check Messages warning comes on IPC comes on for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

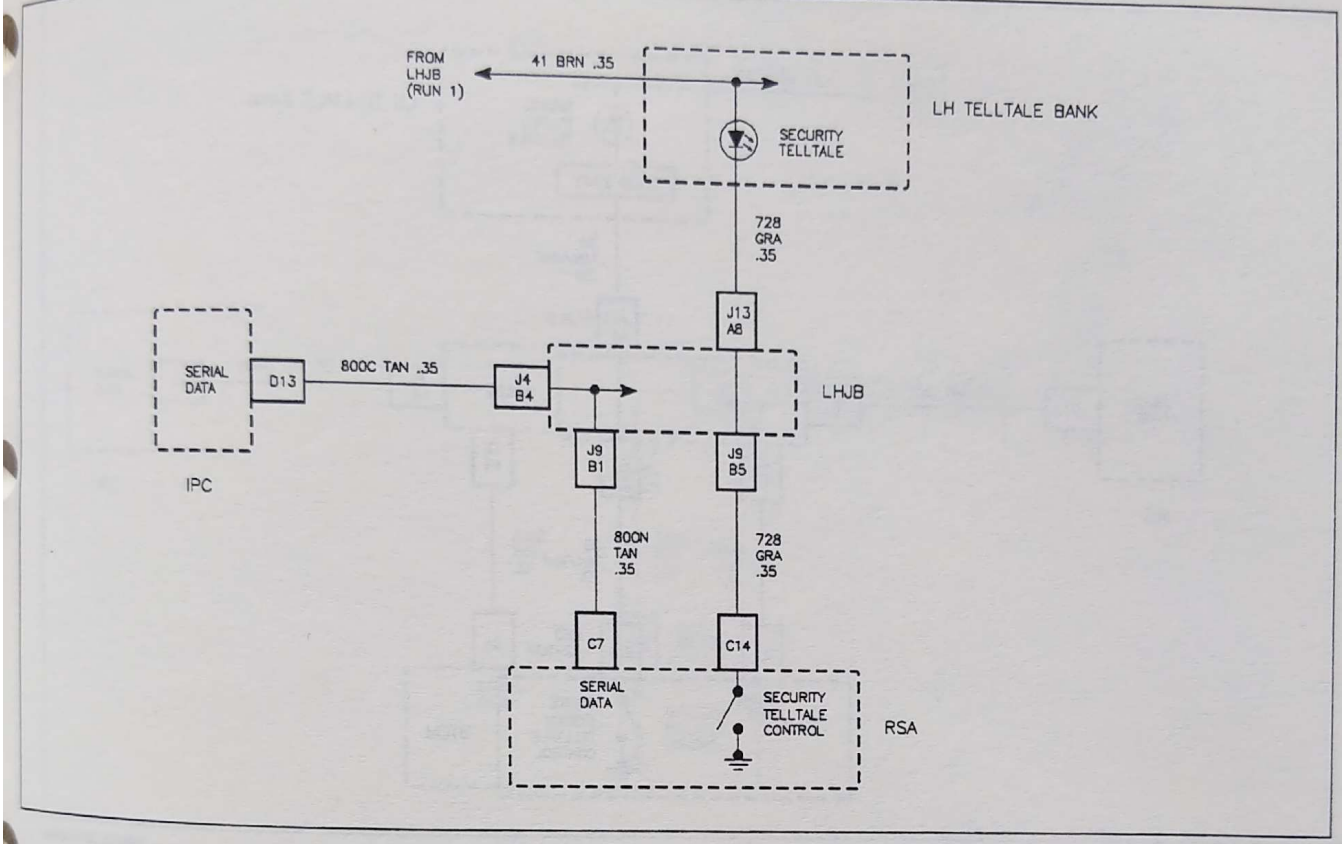
SDM controls the telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. Its presence does not in and of itself indicate a fault, but rather that the air bage telltale was commanded On due to a DTC set in the SDM.
- Check to see if any SIR DTCs are set. If so, refer to the appropriate trouble tree in the "SIR" service manual to diagnose the root cause of the condition.

DTC 041 – SECURITY TELLTALE

IPC



PSMELC67952AA

SECURITY TELLTALE

The run/lock shifter assembly (RSA) grounds circuit 728 to turn On the security telltale. The instrument panel cluster (IPC) receives a message over serial data from the RSA indicating the security telltale was turned On.

DTC PARAMETERS

IPC receives a message from RSA over serial data that the security telltale was turned On.

ACTION TAKEN BY THE IPC

- Registers a history DTC 41.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

- If security telltale is flashing there may be communication DTCs set.
- PCM

TELLTALE ILLUMINATED

This history DTC was set because the decurity telltale was turned On.

Check Messages warning comes on IPC comes on for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

RSA controls the telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. The presence of this DTC indicates the security telltale was commanded On. This could be due to:

  1. Driver entering 25 or more digits on either the external or RSA keypads without having entered the valid code (security telltale will be On solid).

  2. The RSA detects a loss of serial data communications sufficient to prevent a security handshake with the propulsion system (security telltale will be flashing).

- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree for any DTC set to diagnose the root cause of the condition.

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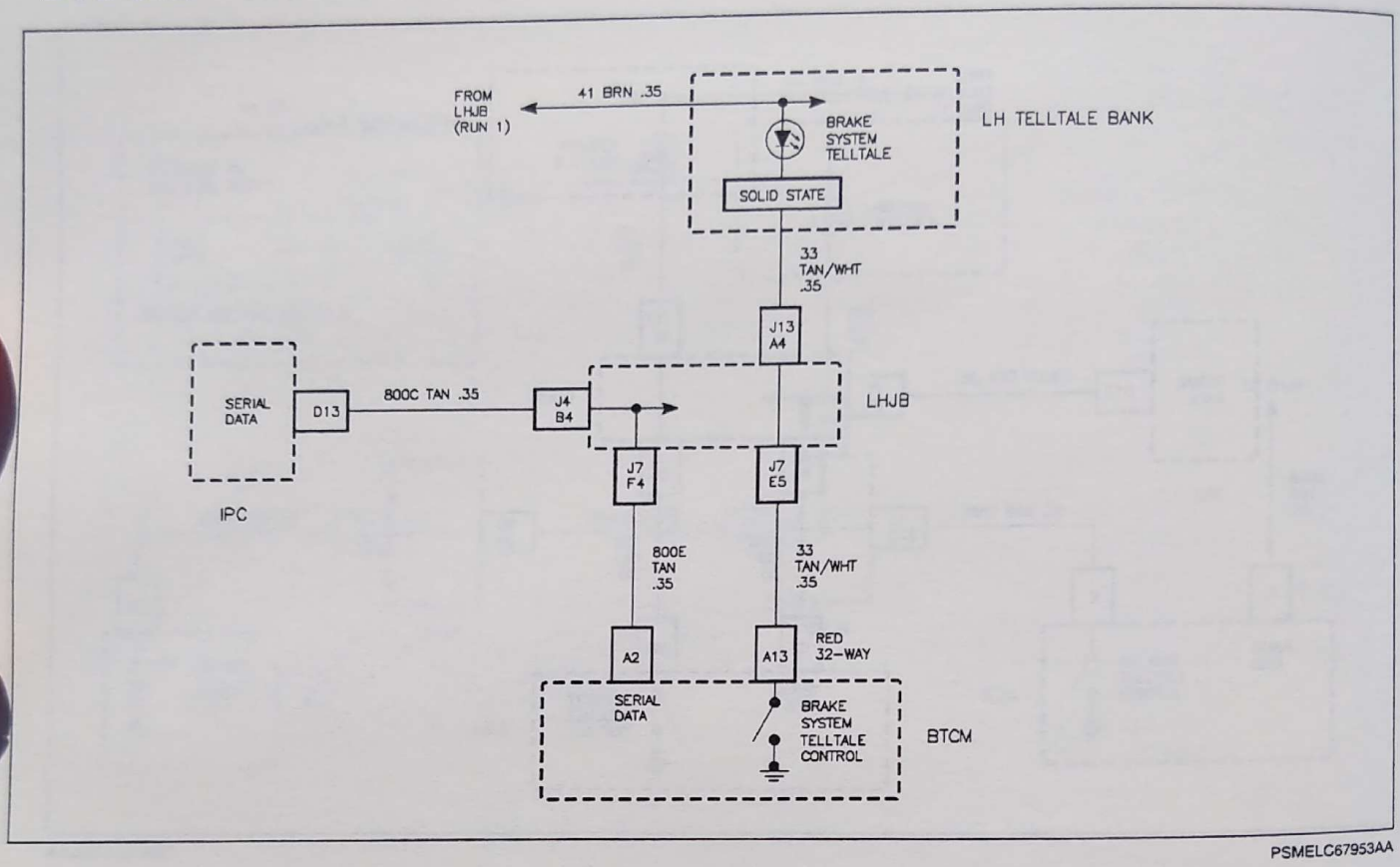
DTC 042 – BRAKE TELLTALE

IPC



PSMELC67953AA

BRAKE TELLTALE

The brake torque control module (BTCM) grounds circuit 33 to turn On the brake system telltale. The instrument panel cluster (IPC) receives a message over serial data from the BTCM indicating the Brake System telltale was turned On.

DTC PARAMETERS

IPC receives a message from BTCM over serial data that the brake system telltale was turned On.

ACTION TAKEN BY IPC

- Registers a history DTC 42.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

BTCM DTCs 14-18, 23, 24, 27-31, 34-51, 54-63, 66-71, 74-134, 142-151, 155-166.

TELLTALE ILLUMINATED

This history DTC was set because the brake system telltale was turned On.

Check Messages warning on IPC comes on for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

BTCM controls the telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. The presence of this DTC indicates the brake system telltale was commanded On by the BTCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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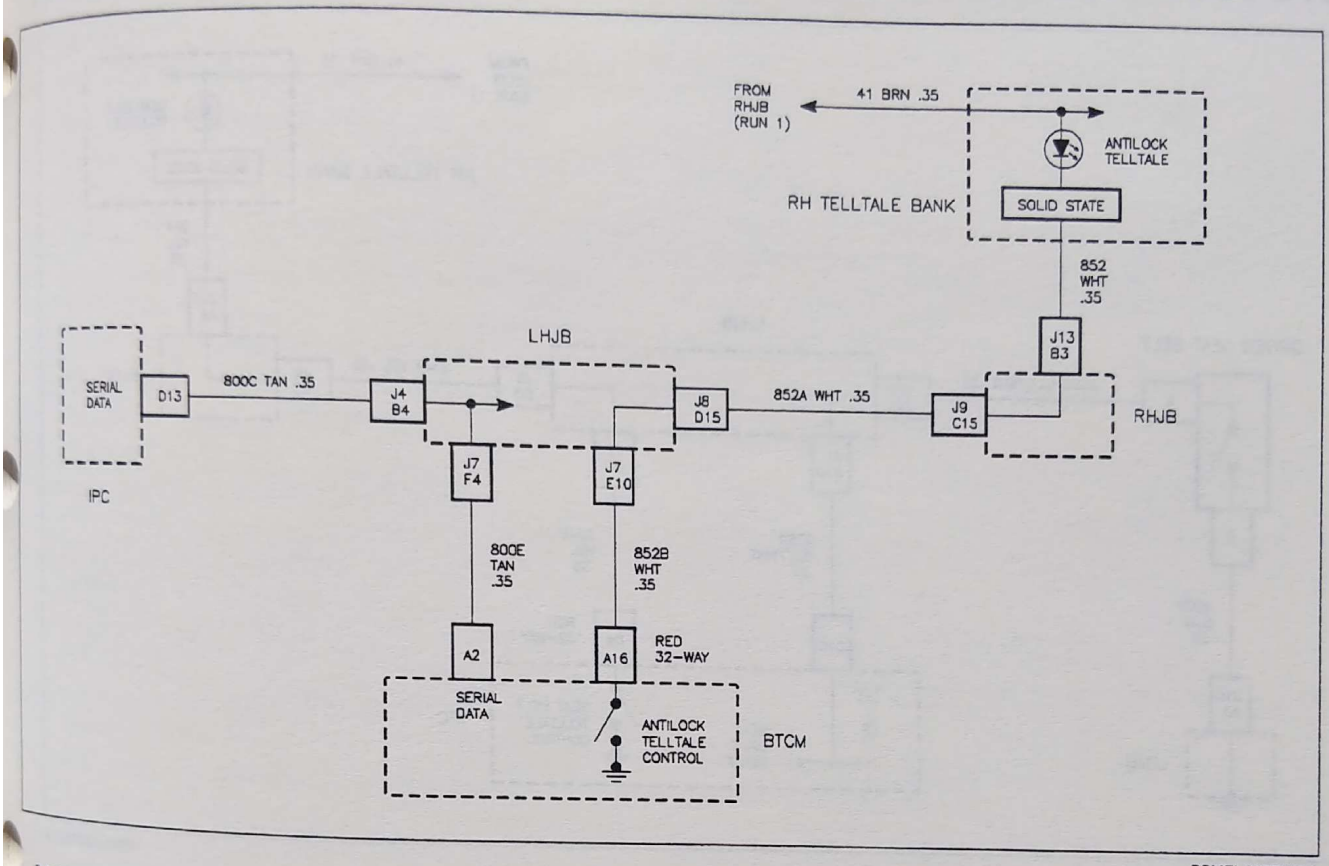
DTC 043 – ANTI-LOCK TELLTALE

IPC



PSMELC67954AA

ANTI-LOCK TELLTALE

The brake torque control module (BTCM) grounds circuit 852 to turn On the antilock telltale. The instrument panel cluster (IPC) receives a message over serial data from the BTCM indicating the antilock telltale was turned On.

DTC PARAMETERS

IPC receives a message from BTCM over serial data that the antilock telltale was turned On.

ACTION TAKEN BY IPC

- Registers a history DTC 43.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

BTCM DTCs 14, 16-37, 51-63, 66-71, 74-83, 86,87, 114, 116, 118, 125-132, 143-152, 155-163.

TELLTALE ILLUMINATED

This history DTC was set because the antilock telltale was turned On.

Check Messages warning on IPC comes on for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

BTCM controls the telltale.

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. The presence of this DTC indicates the antilock telltale was commanded On by the BTCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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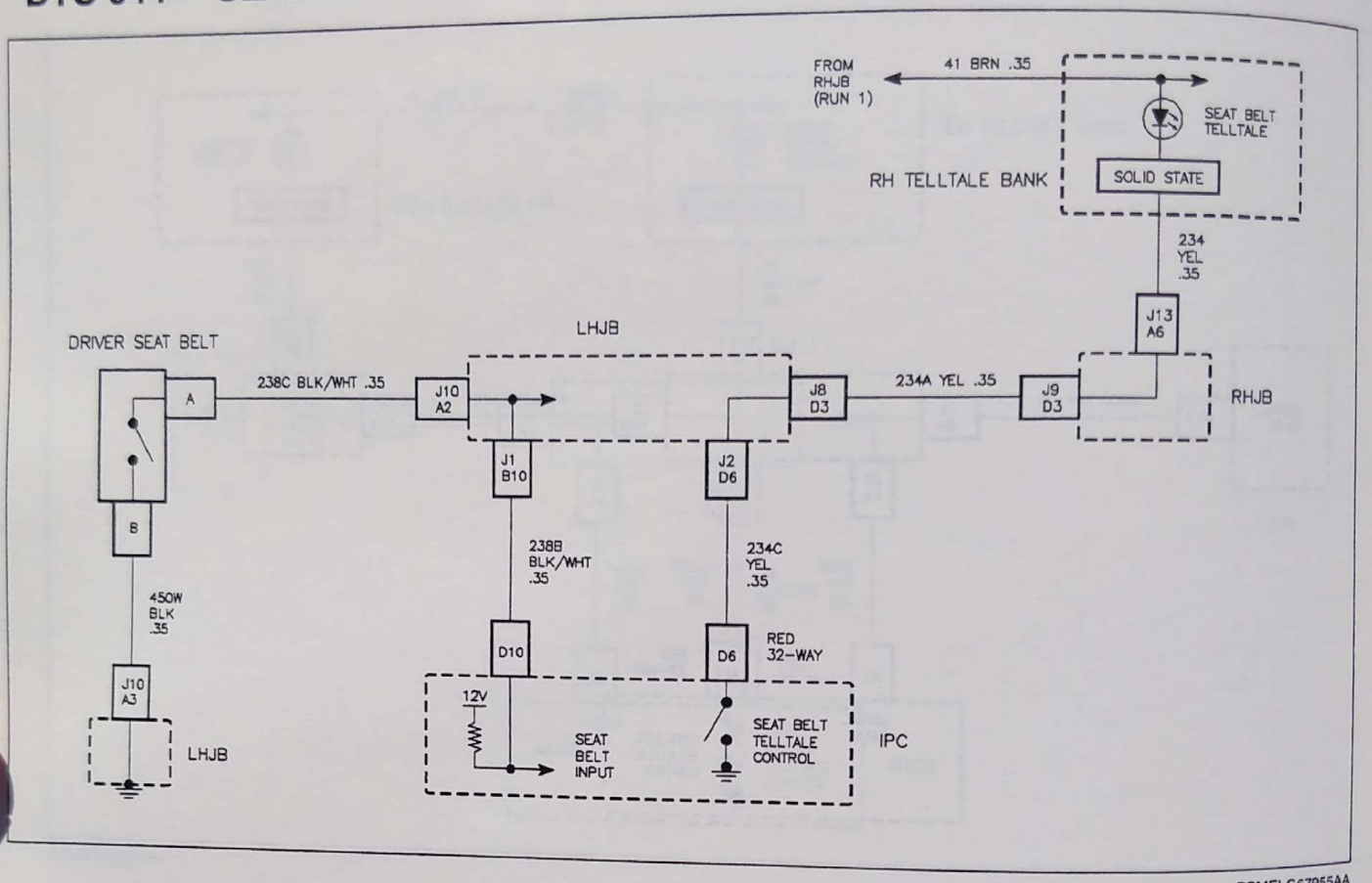
DTC 044 – SEAT BELT TELLTALE

IPC



PSMELC67955AA

SEAT BELT TELLTALE

The instrument panel cluster (IPC) grounds circuit 234 to turn On the seat belt telltale when the driver's seat belt is unfastened.

DTC PARAMETERS

Seat belt telltale turned On by the IPC.

ACTION TAKEN BY IPC

- Registers a history DTC 44.
- Initiates a single chime and Check Messages warning.

RELATED DTCS

None

TELLTALE ILLUMINATED

This history DTC was set because the seat belt telltale was turned On.

Check Messages warning on IPC comes On for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

None

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. The presence of this DTC indicates the seat belt telltale was turned On due to the drivers seat belt being unbuckled.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

NOTES

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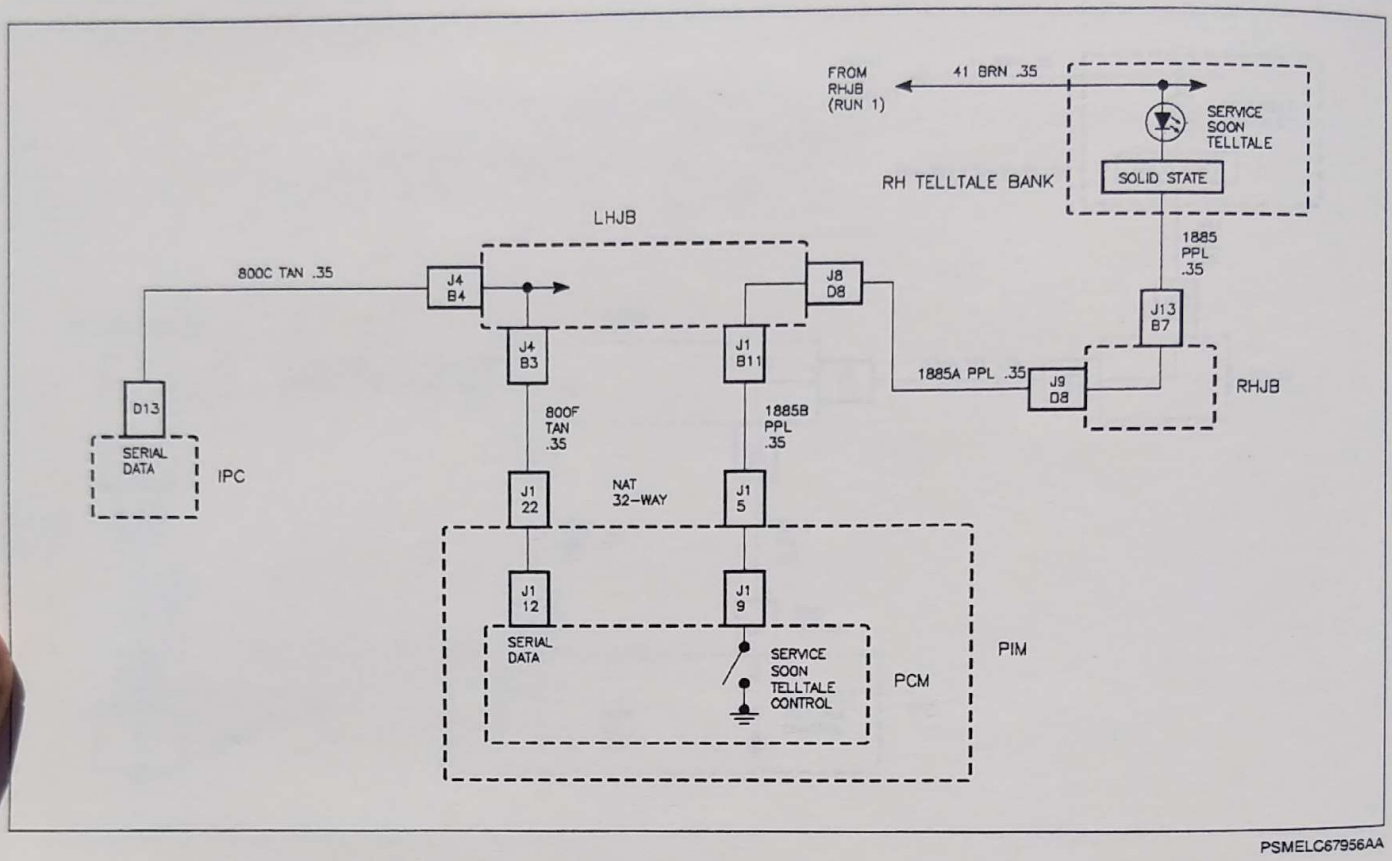
DTC 045 – PCM SERVICE SOON TELLTALE IPC



PSMELC67956AA

PCM SERVICE SERVICE SOON TELLTALE

The propulsion control module (PCM) grounds circuit 1885 to turn On the service soon telltale based on a PCM, battery pack module (BPM), Accessory AC and DC power module (APM), brake torque control module (BTCM), or HPVS/thermal control module (HTCM) failure. If the condition is detected by a module other than the PCM, a signal is sent to the PCM that the service soon telltale should be turned On. The PCM sends a message over the serial data line to the instrument panel cluster (IPC) when it turns On the service soon telltale so the IPC will turn On the Check Messages indicator and sound the chime.

DTC PARAMETERS

Service soon telltale request received from the PCM.

ACTION TAKEN BY IPC

Register a history DTC 45.

Initiates a single chime and Check Messages warning.

RELATED DTCS

The following DTCs cause the service soon telltale to be turned On, resulting in a IPC history DTC 45:

BPM:

- Accessory Range Fault (227)
- BP V Correlation Fault (219)
- BP Voltage Open Fault (217)
- BPM Hardware Malf (304)
- CP Short Detected (286)
- High Voltage Open Fault (229)
- Pack Current Fault (225, 226)
- Pack Temp Fault (3 or more of 233-266)
- PARK Correlation Fault (285)
- Prop Batt Voltage Fault (3 or more Module Voltage Faults)
- Reference Range Fault (228)
- Unintended Charge Detected (292, 291)

PCM:

- PEB temp. sensor shorted to ground (01)
- PEB temp. sensor open or shorted to battery (02)
- Motor winding temp. sensor shorted to ground (03)
- Motor winding temp. sensor open or shorted to battery (04).
- Vehicle Speed input too noisy (08)
- Regenerative braking retard request invalid (10, 11, 12, or 13)
- Loss of serial data from BPM, BTCM, RSA, HTCM (26, 27, 28, 29)
- PCM RAM or ROM failure (30, 31)

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RELATED DTCS (CONTINUED)

- Oil pressure sensed after oil pump commanded OFF (33)
- Regen disable correlation failure (41)
- Retard request correlation failure (42)
- Commanding regen, BPM doesn't indicate regen charging (47)
- Processor, memory, or timing problem (48, 49, 50)
- Commanded current has exceeded current feedback signal (51)
- BCA Fault input(s) not true at power-up (54, 55, 56)
- Short detected on $\geq$ 1 QDSM outputs for > 0.25 sec (57)
- Current feedback $\neq$ 0 during BCA Enable powerup test (73)
- PCM and BPM charge paddle present inputs disagree (97)
- Output voltage of V5B supply is <> thresholds (98, 99, 100, 101)
- Regen brkg disabled; BTCM detected Retard Achieved fault (103)
- HV interlock is open for 250 ms, but Scaled VBAT>42.5V (105)
- BCA bias fault not set after IGN1 was low @ powerdown (106)
- Retard Request input duty cycle is too low or too high (107)

HTCM and APM:

- Drive unit temp sensor failure (12)
- Coolant temp sensor failure (14)
- Ambient temp sensor (16)
- APM shutdown (27)
- Heated windshield crack (28)
- CMC over/under voltage (31)
- APM 12V out of range minor (39)
- APM 47V isolation failure (41)
- APM 47V out of range (42)
- HTCM processor failure (45)
- Coolant pump failure (50)
- Low or high pressure (52, 53)
- Low coolant (54)
- Coolant valve failure (58, 59, 60)
- Charge port valve failure (62, 63, 64)
- Coolant level sensor failure (17)

BTCM:

- Telltale failure (11)
- Retard Achieved communication fault (141)
- Retard Achieved correlation fault (167)
- Retard Achieved duty cycle not within bounds (168)

TELLTALE ILLUMINATED

This history DTC was set because the service soon telltale was turned On.

Check Messages warning on IPC comes On for seven seconds every five minutes.

OTHER CONTROLLER INTERFACES

DIAGNOSTIC AIDS

- This DTC will only show up as a history DTC. The presence of this DTC is not in and of itself indicating a fault, but rather that the service soon telltale was commanded On due to problem registered by either the PCM, BPM, APM, BTCM, or HTCM.
- Check to see if any of the DTCs listed under RELATED DTCS are set. If so, refer to the appropriate trouble tree to diagnose the root cause of the condition.

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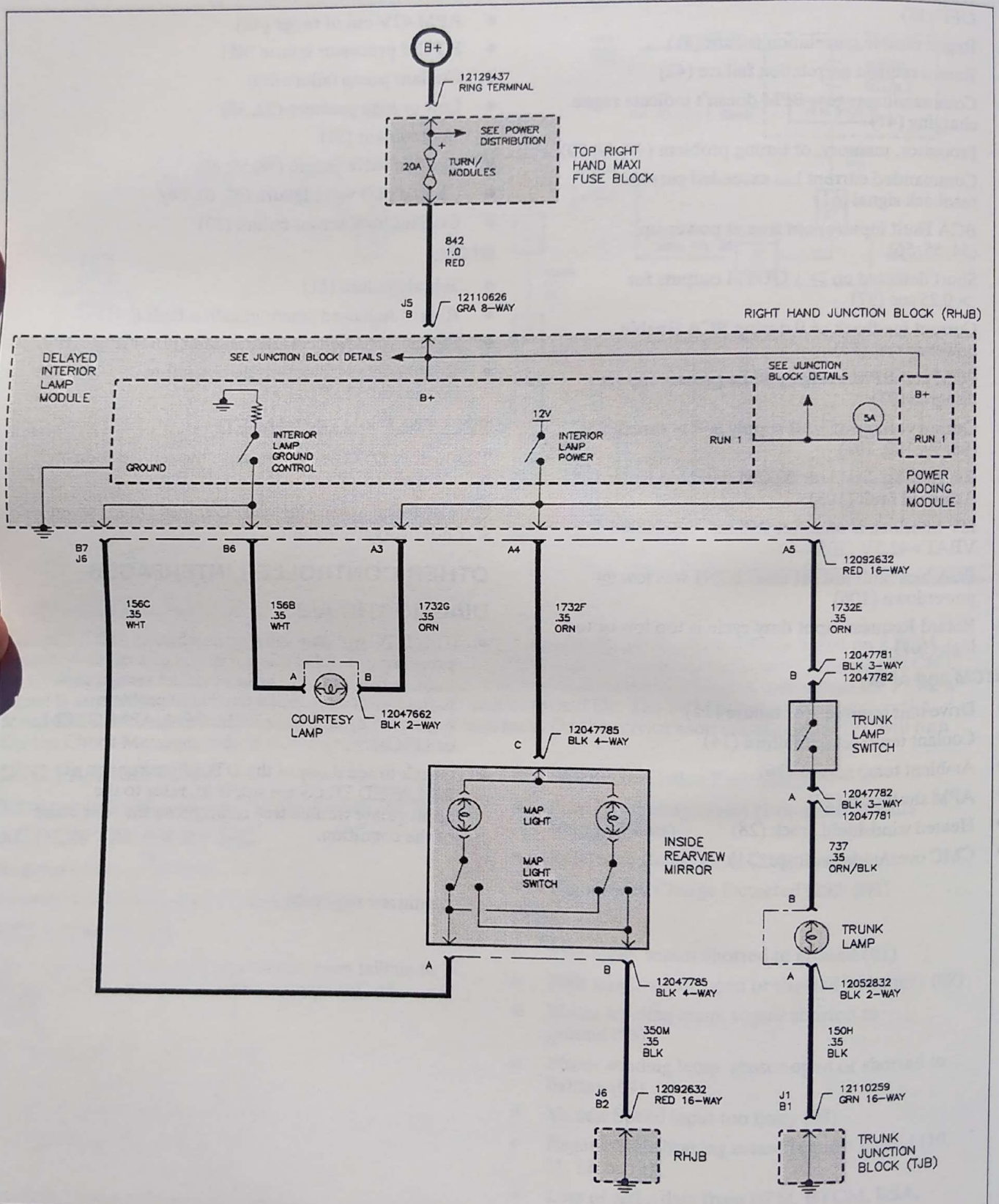
INTERIOR LIGHTS



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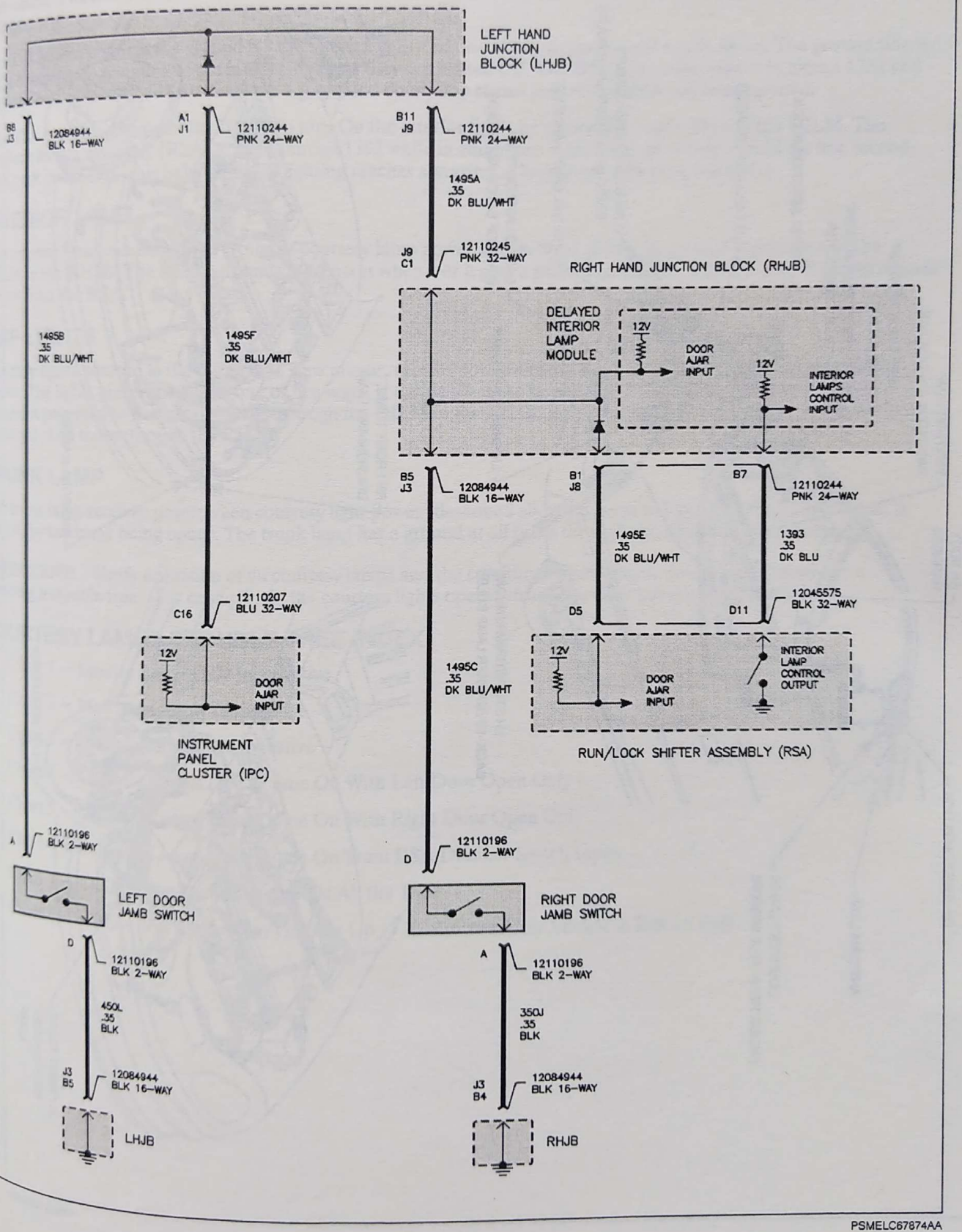
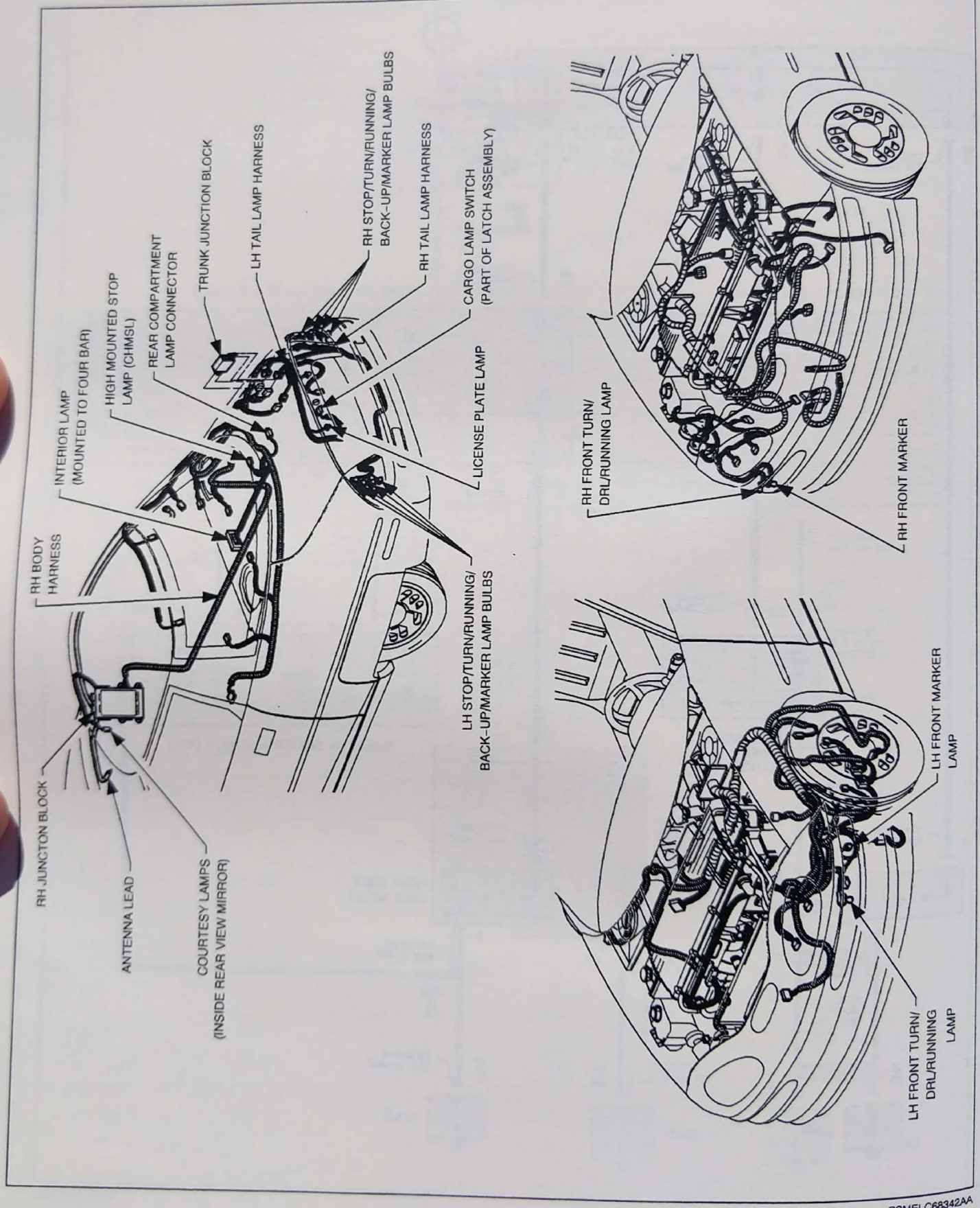


PSMELC67874AA

INTERIOR LIGHTS COMPONENT LOCATION VIEWS



COURTESY LAMPS

The courtesy lamps are all powered over circuit 1732 by the delayed interior lamp module (DILM), located in the right hand junction block (RHJB). This power is held high whenever in Run or Off/ACCY and in Lock for 20 minutes after the vehicle is turned Off. It is then deactivated to help protect the battery in case the map light or the trunk light were left On.

The DILM also controls the ground for the interior light and one of the grounds for the map lights. The ground side is pulsed to provide dimming of the interior lights as they are turned Off. The DILM provides power to circuit 1732 and ground to circuits 156 and 661 whenever a grounded door jamb circuit indicates a door has been opened.

The RSA can also command the DILM to turn On the interior lights by grounding circuit 1393 to the DILM. The run/lock shifter assembly (RSA) grounds circuit 1393 while in Run mode if the Dim up button is held for one second with park lamps Off, or is held until backlighting reaches a maximum brightness with park lamps On.

INTERIOR LAMP

The interior lamp receives power from the courtesy lamp power as described above. Its ground is provided by the DILM in the RHJB. The DILM grounds this circuit whenever it sees a ground on its door ajar input or the lamp control circuit from the RSA.

MAP LIGHTS

The map lights, located in the inside rear view mirror, receive power directly from courtesy light power as described above. The lights can be grounded one of two ways. If the switches are turned Off, the lamps come On only when a ground is provided to the interior lamp through the DILM in the RHJB. If the switches are turned On, the lamps have a ground at all times through the RHJB.

TRUNK LAMP

The trunk lamp receives power when courtesy light power (described above) is provided and the trunk lamp switch is closed (by the trunk being open). The trunk lamp has a ground at all times through the trunk junction block.

IMPORTANT: Verify operation of all courtesy lamps and the conditions under which the failure occurs before selecting a trouble tree. (For example, do the courtesy lights operate from one door but not the other?)

COURTESY LAMPS TROUBLE TREE INDEX

- Chart 1 – Interior Lamp Only Inoperative
- Chart 2 – Map Lights Only Inoperative
- Chart 3 – Trunk Lamp Only Inoperative
- Chart 4 – Courtesy Lamps Don't Come On With Left Door Open Only
- Chart 5 – Courtesy Lamps Don't Come On With Right Door Open Only
- Chart 6 – Courtesy Lamps Don't Come On From RSA Dimmer Switch Input
- Chart 7 – All Courtesy Lamps Inoperative All the Time
- Chart 8 – All Courtesy Lamps Stay On (For Up to 20 Minutes After Vehicle is Turned Off)

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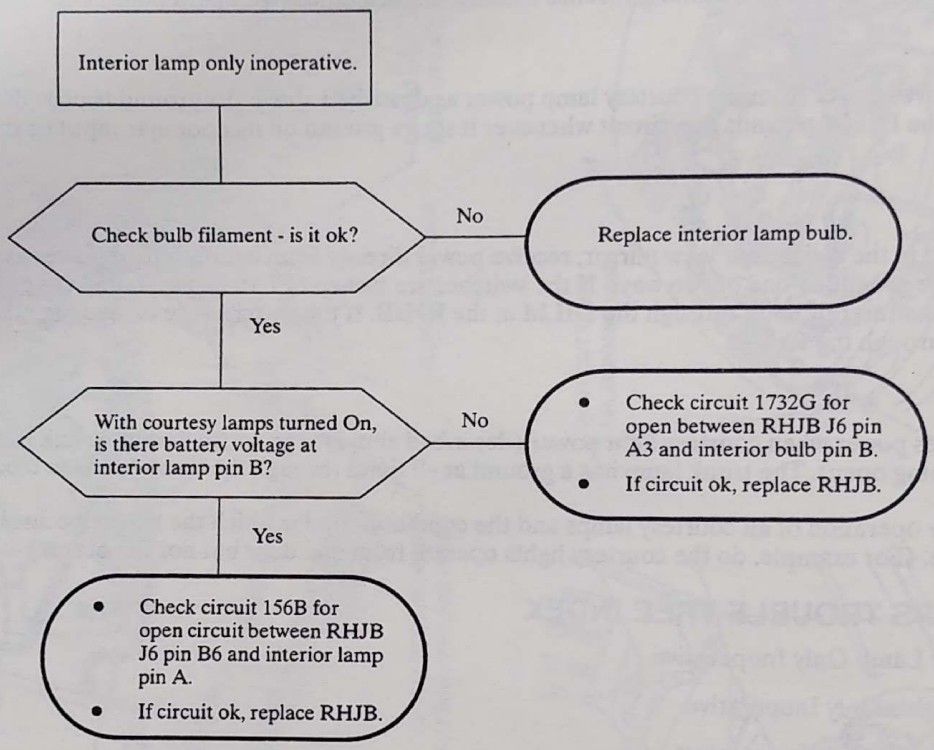
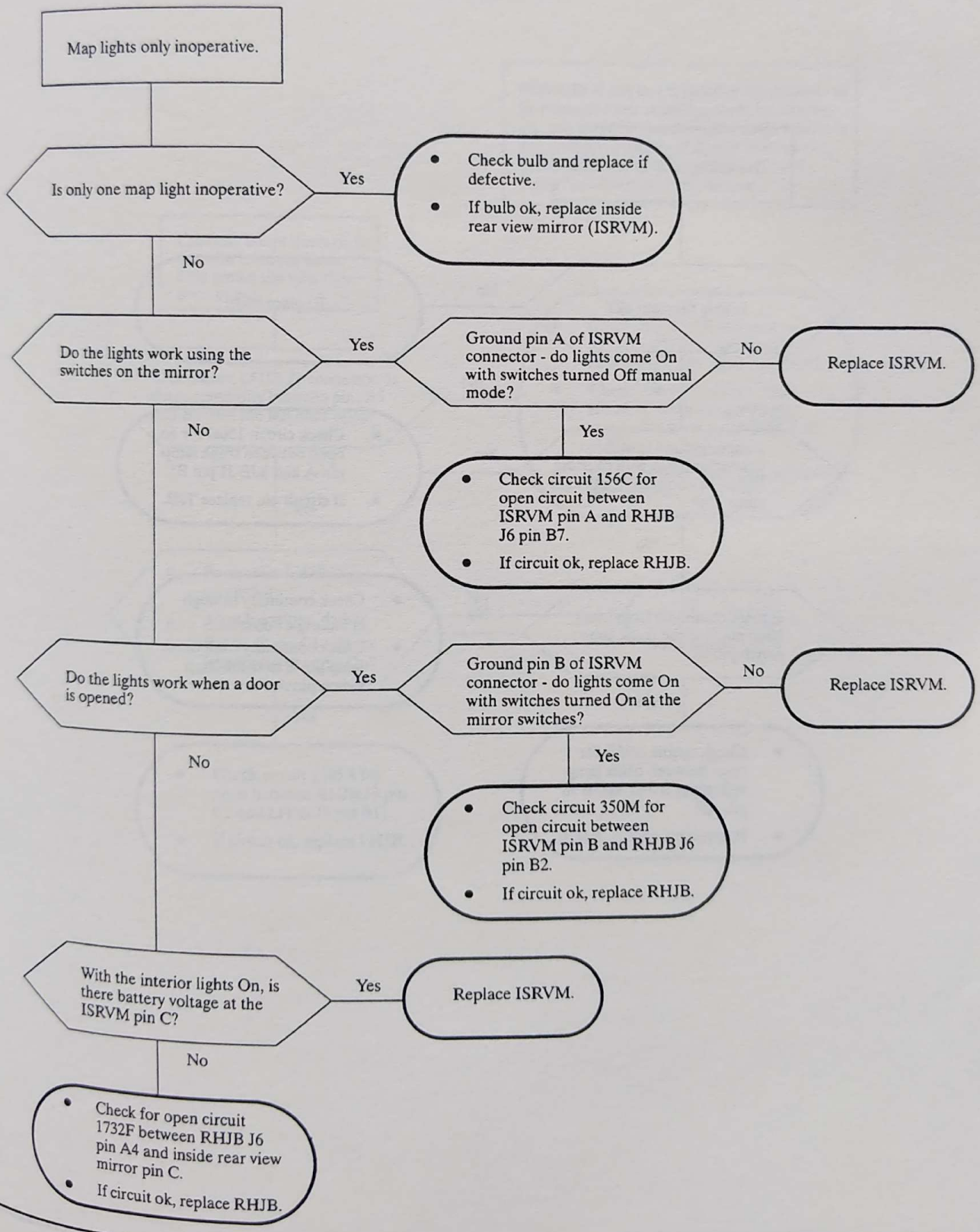
INTERIOR LAMP ONLY INOPERATIVE

CHART 1



MAP LIGHTS ONLY INOPERATIVE

CHART 2



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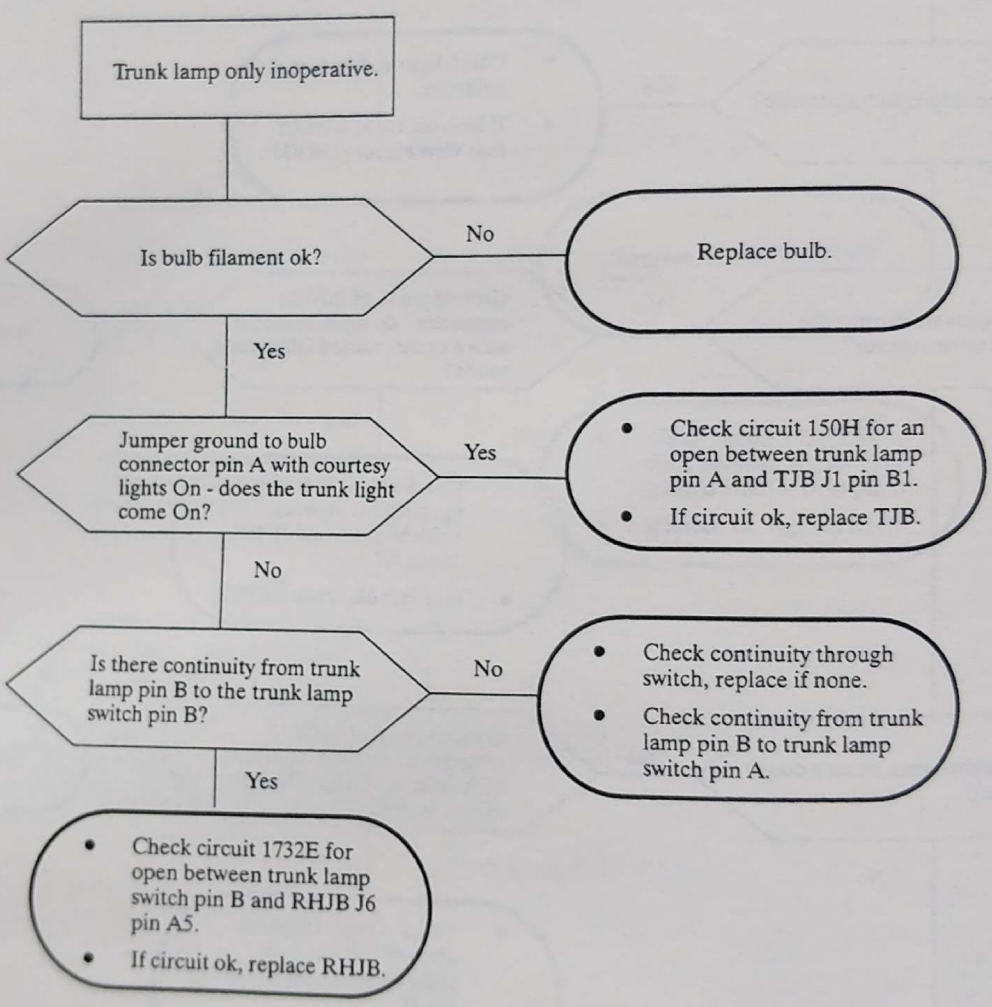
TRUNK LAMP ONLY INOPERATIVE

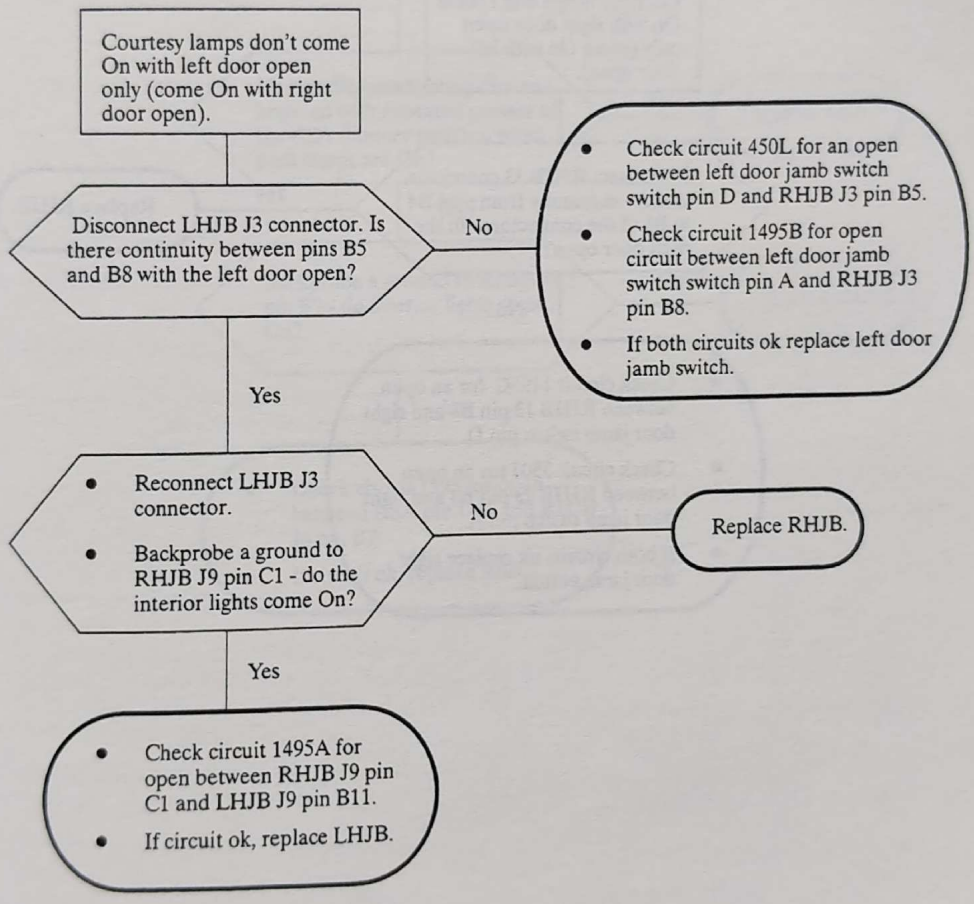
CHART 3



COURTESY LAMPS DON'T COME ON WITH LEFT DOOR OPEN ONLY (COME ON WITH RIGHT DOOR OPEN)

CHART 4

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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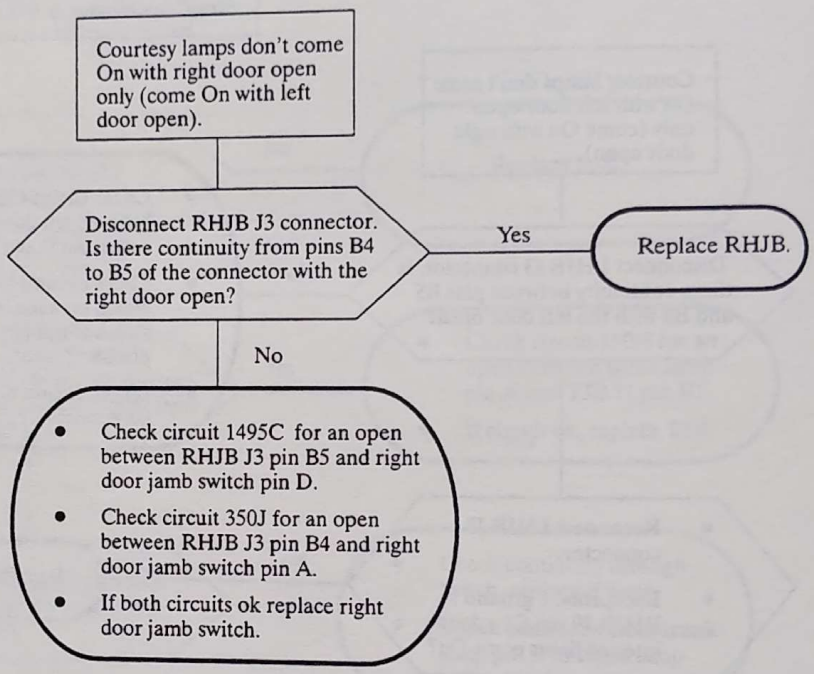
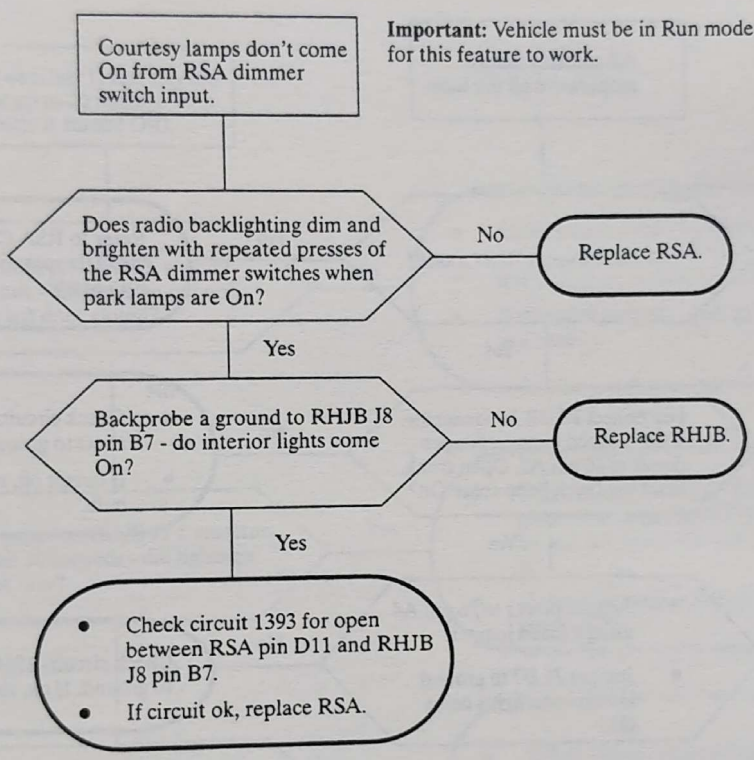
COURTESY LAMPS DON'T COME ON WITH RIGHT DOOR OPEN ONLY (COME ON WITH LEFT DOOR OPEN)

CHART 5



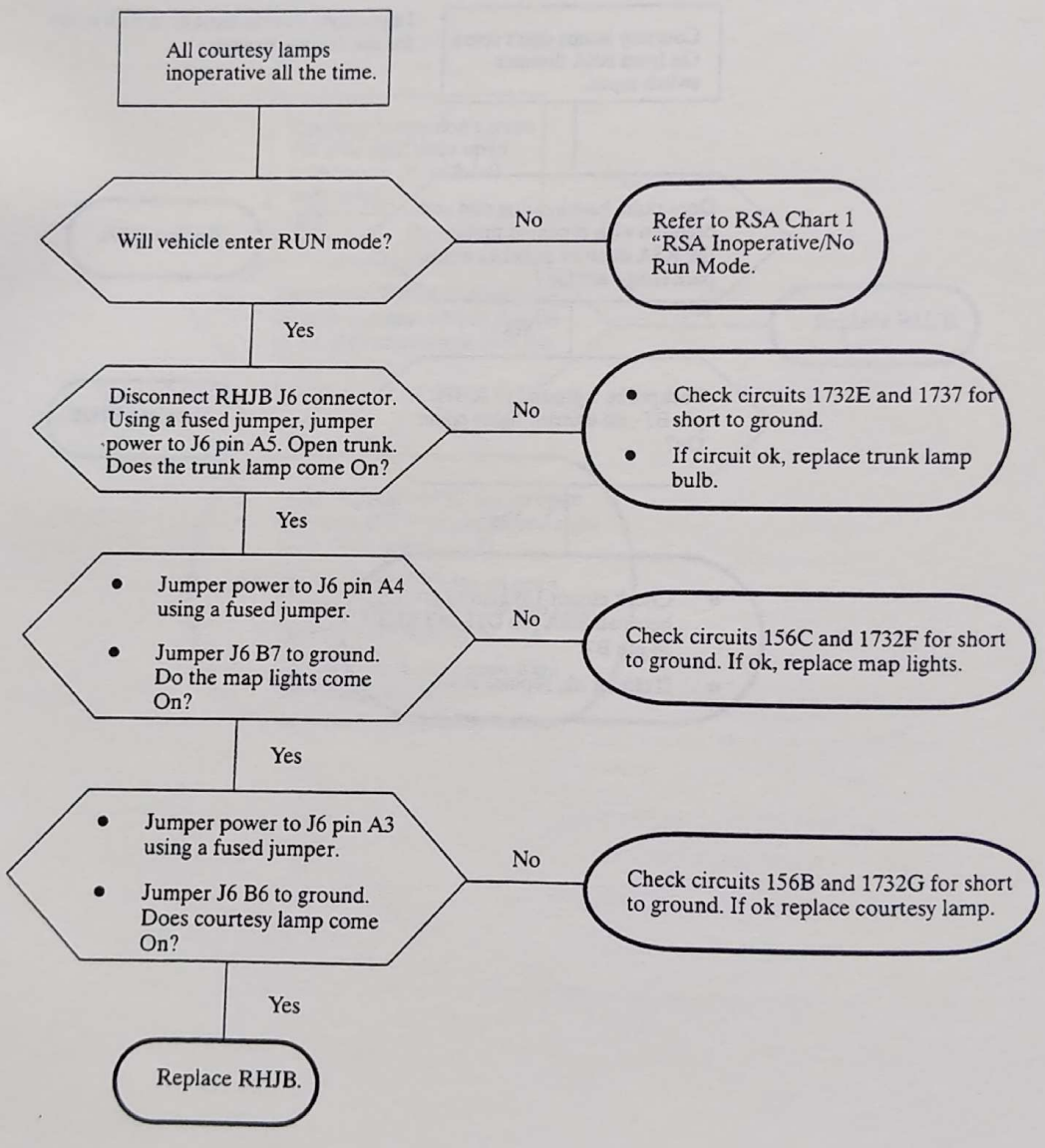
COURTESY LAMPS DON'T COME ON FROM RSA DIMMER SWITCH INPUT

CHART 6



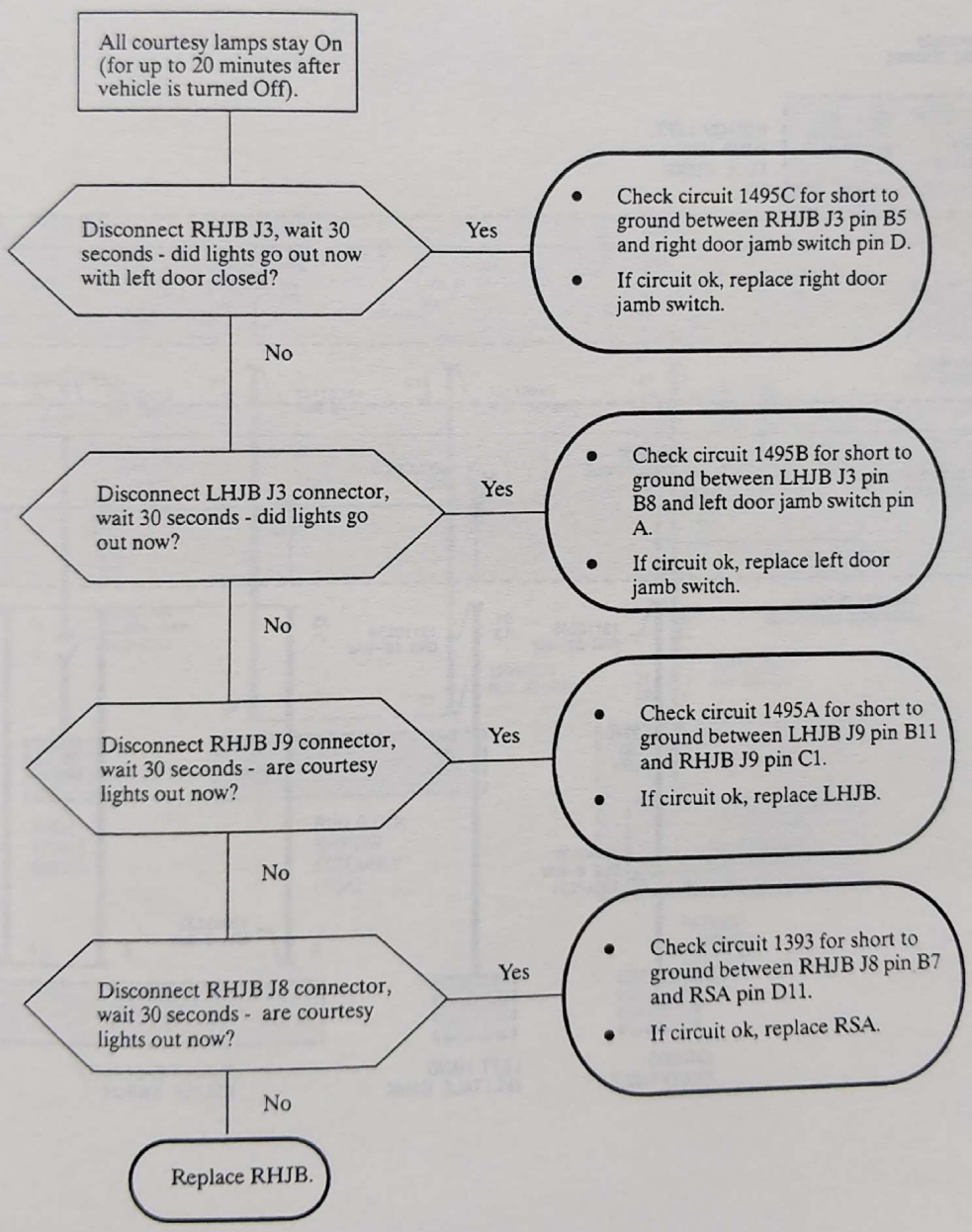
ALL COURTESY LAMPS INOPERATIVE ALL THE TIME

CHART 7

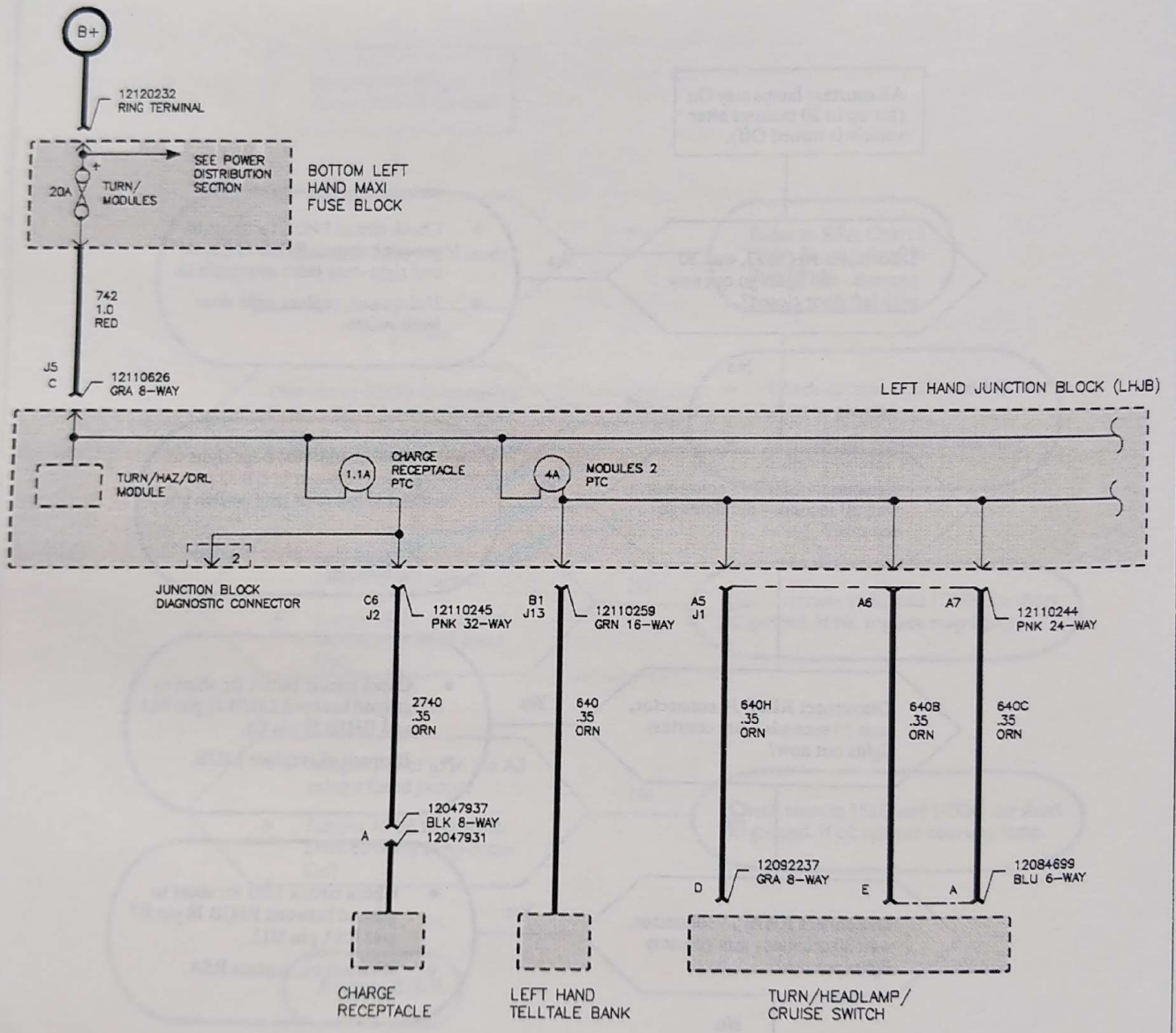


ALL COURTESY LAMPS STAY ON (FOR UP TO 20 MINUTES AFTER VEHICLE IS TURNED OFF)

CHART 8



JUNCTION BLOCK DETAILS



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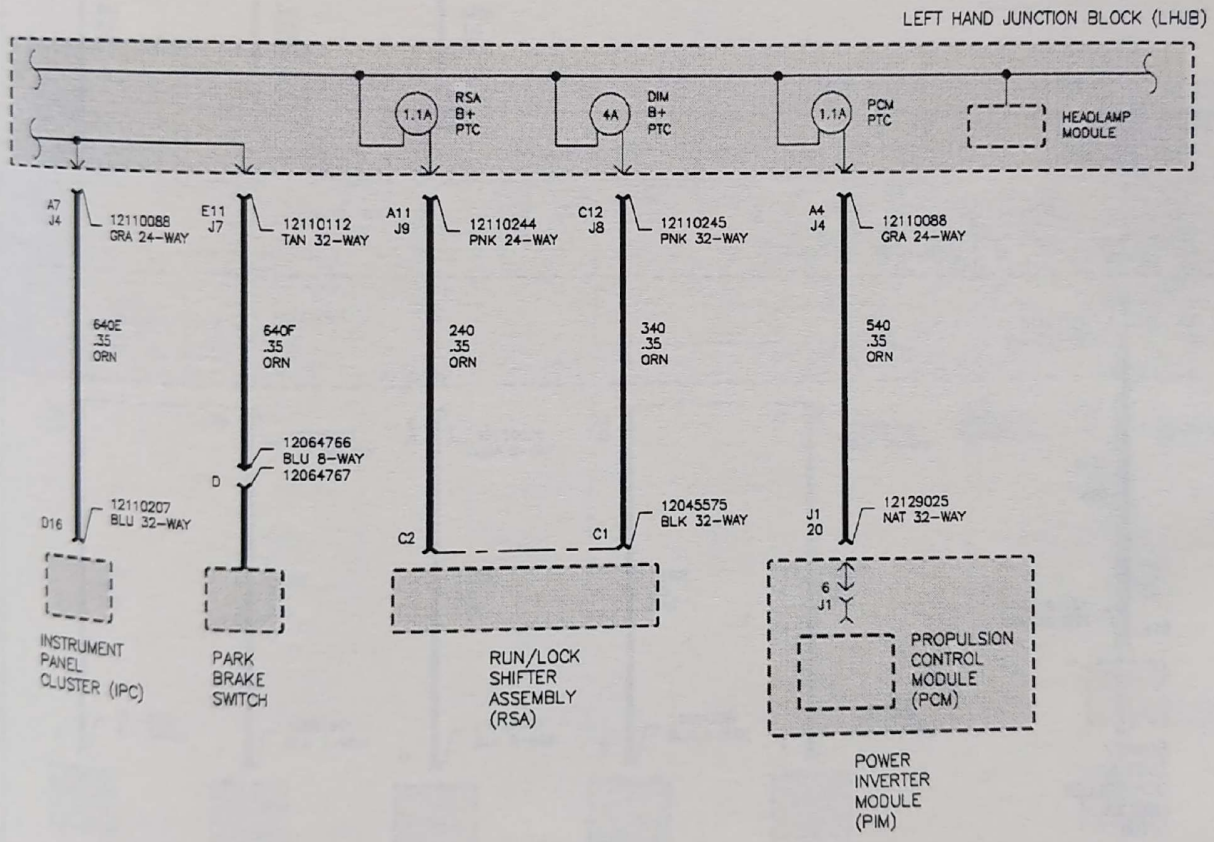

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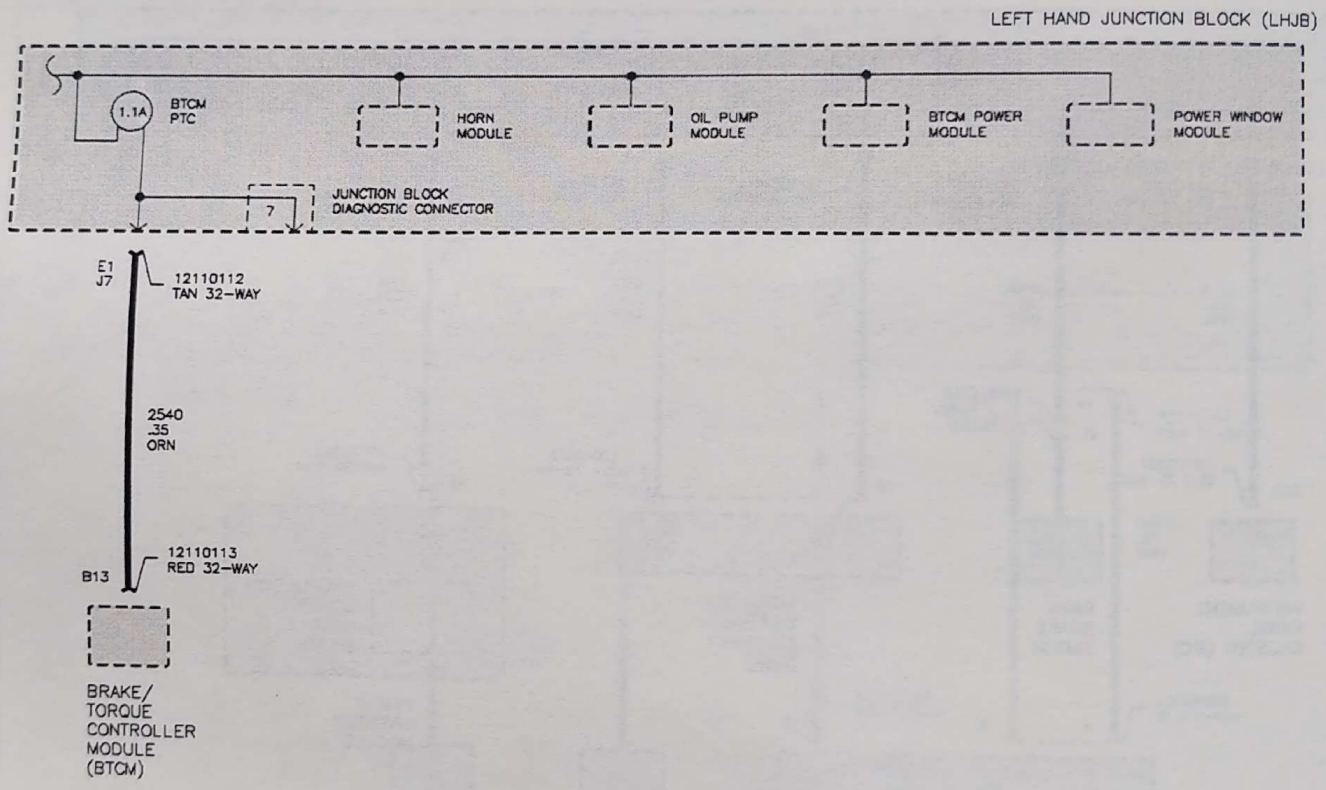

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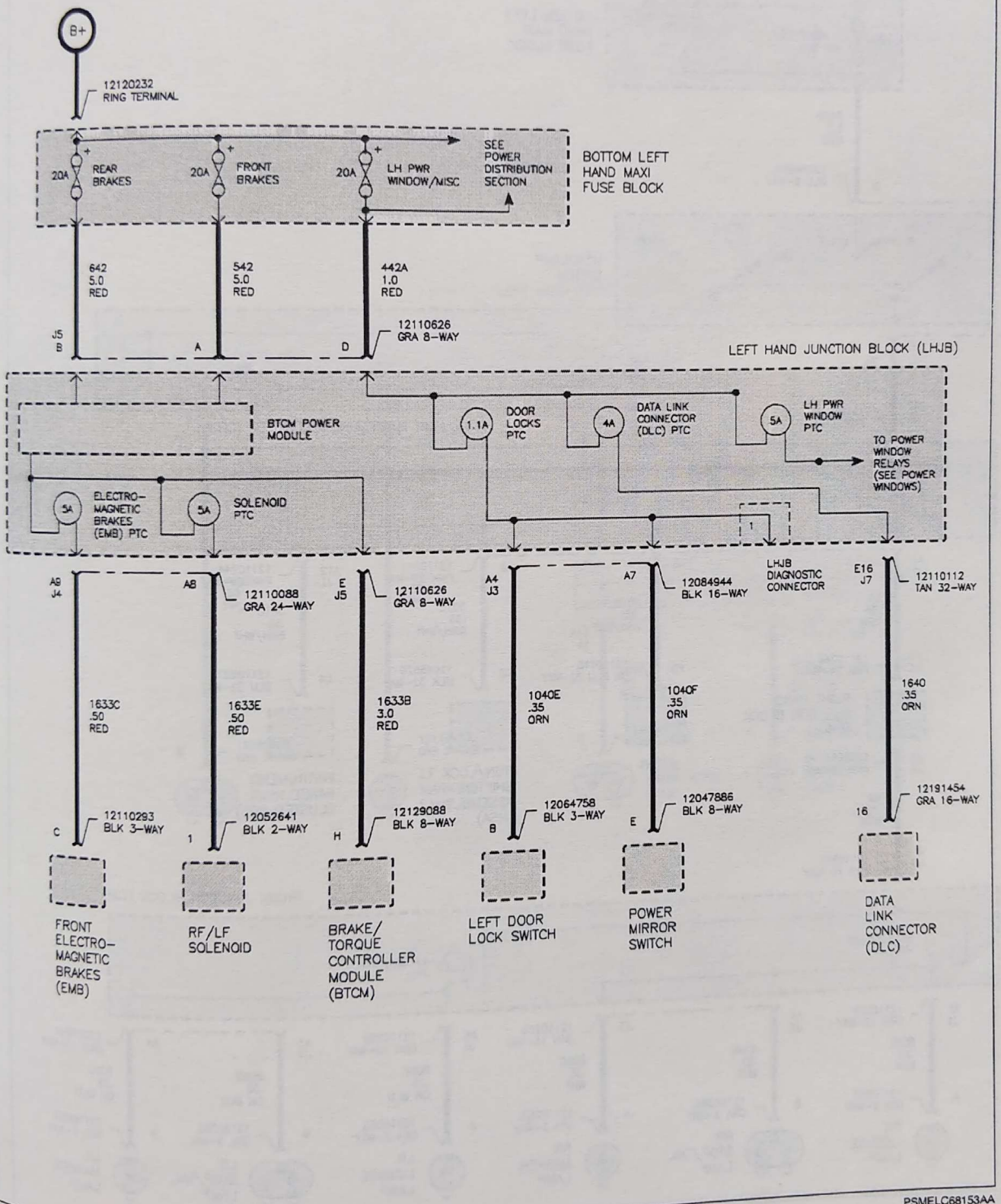

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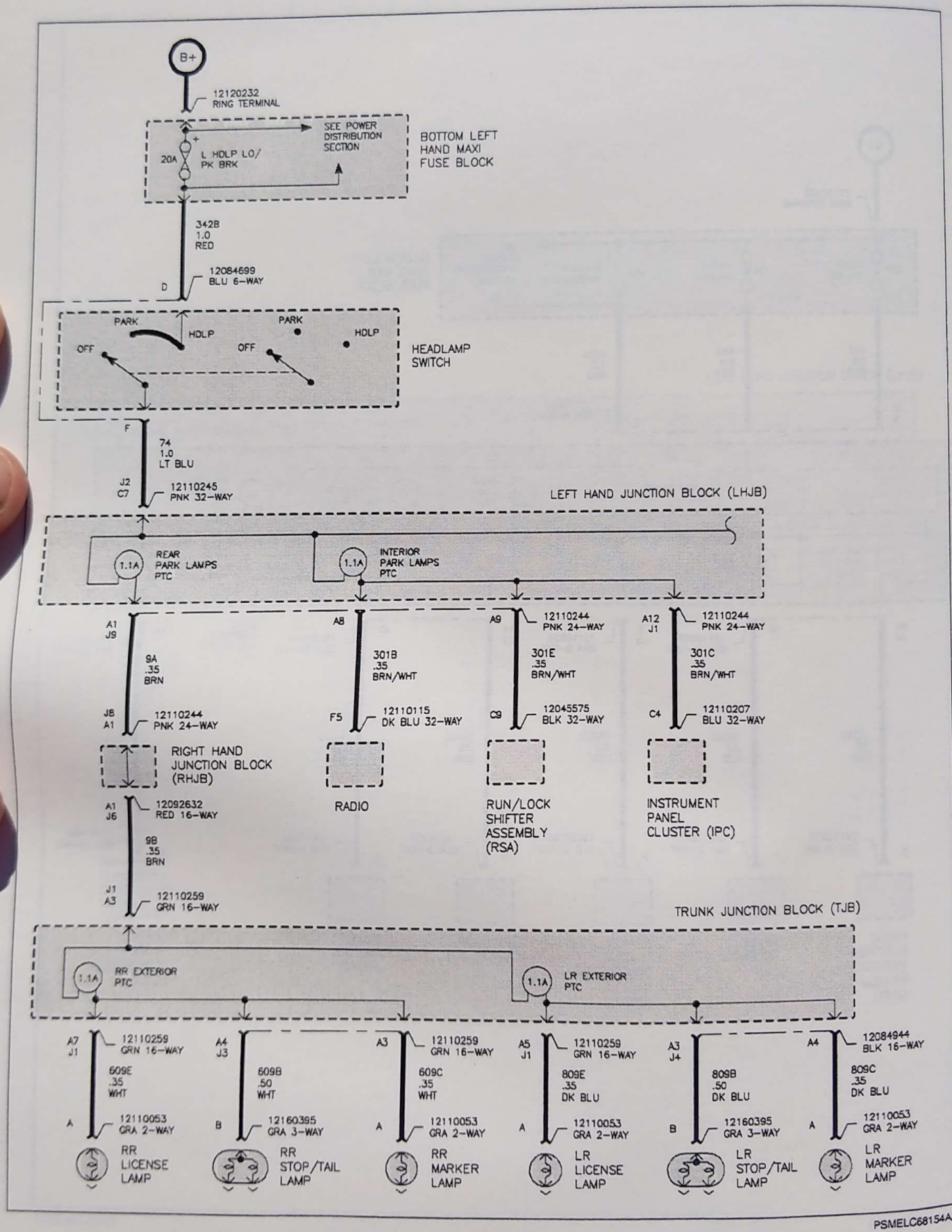
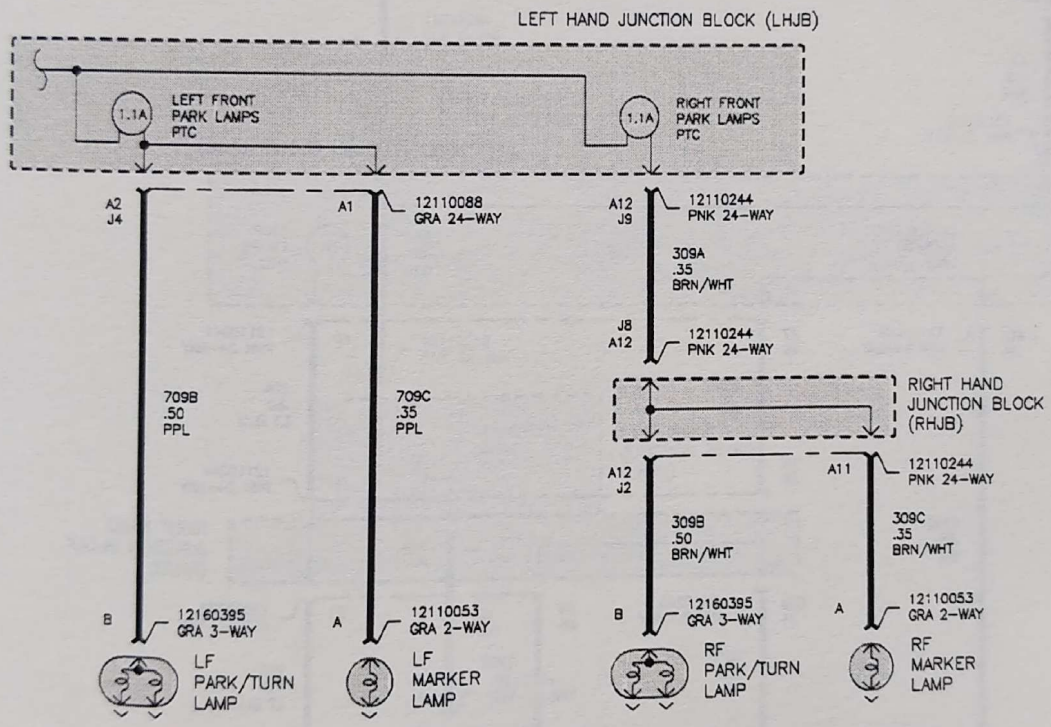

B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION SECTION
BOTTOM LEFT HAND MAXI FUSE BLOCK
20A
L HDLP LO/ PK BRK
342B
1.0
RED
D
12084699
BLU 6-WAY
PARK
HDLP
OFF
HEADLAMP SWITCH
F
74
1.0
LT BLU
J2
C7
12110245
PNK 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
1.1A
REAR PARK LAMPS PTC
INTERIOR PARK LAMPS PTC
A1
J9
9A
.35
BRN
J8
A1
12110244
PNK 24-WAY
A8
301B
.35
BRN/WHT
F5
12110115
DK BLU 32-WAY
A9
12110244
PNK 24-WAY
301E
.35
BRN/WHT
C9
12045575
BLK 32-WAY
A12
J1
12110244
PNK 24-WAY
301C
.35
BRN/WHT
C4
12110207
BLU 32-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
RADIO
RUN/LOCK SHIFTER ASSEMBLY (RSA)
INSTRUMENT PANEL CLUSTER (IPC)
A1
J6
12092632
RED 16-WAY
9B
.35
BRN
J1
A3
12110259
GRN 16-WAY
TRUNK JUNCTION BLOCK (TJB)
RR EXTERIOR PTC
LR EXTERIOR PTC
A7
J1
12110259
GRN 16-WAY
609E
.35
WHT
A
12110053
GRA 2-WAY
RR LICENSE LAMP
A4
J3
609B
.50
WHT
B
12160395
GRA 3-WAY
RR STOP/TAIL LAMP
A3
12110259
GRN 16-WAY
609C
.35
WHT
A
12110053
GRA 2-WAY
RR MARKER LAMP
A5
J1
12110259
GRN 16-WAY
809E
.35
DK BLU
A
12110053
GRA 2-WAY
LR LICENSE LAMP
A3
J4
809B
.50
DK BLU
B
12160395
GRA 3-WAY
LR STOP/TAIL LAMP
A4
12084944
BLK 16-WAY
809C
.35
DK BLU
A
12110053
GRA 2-WAY
LR MARKER LAMP
PSMELC68154AA



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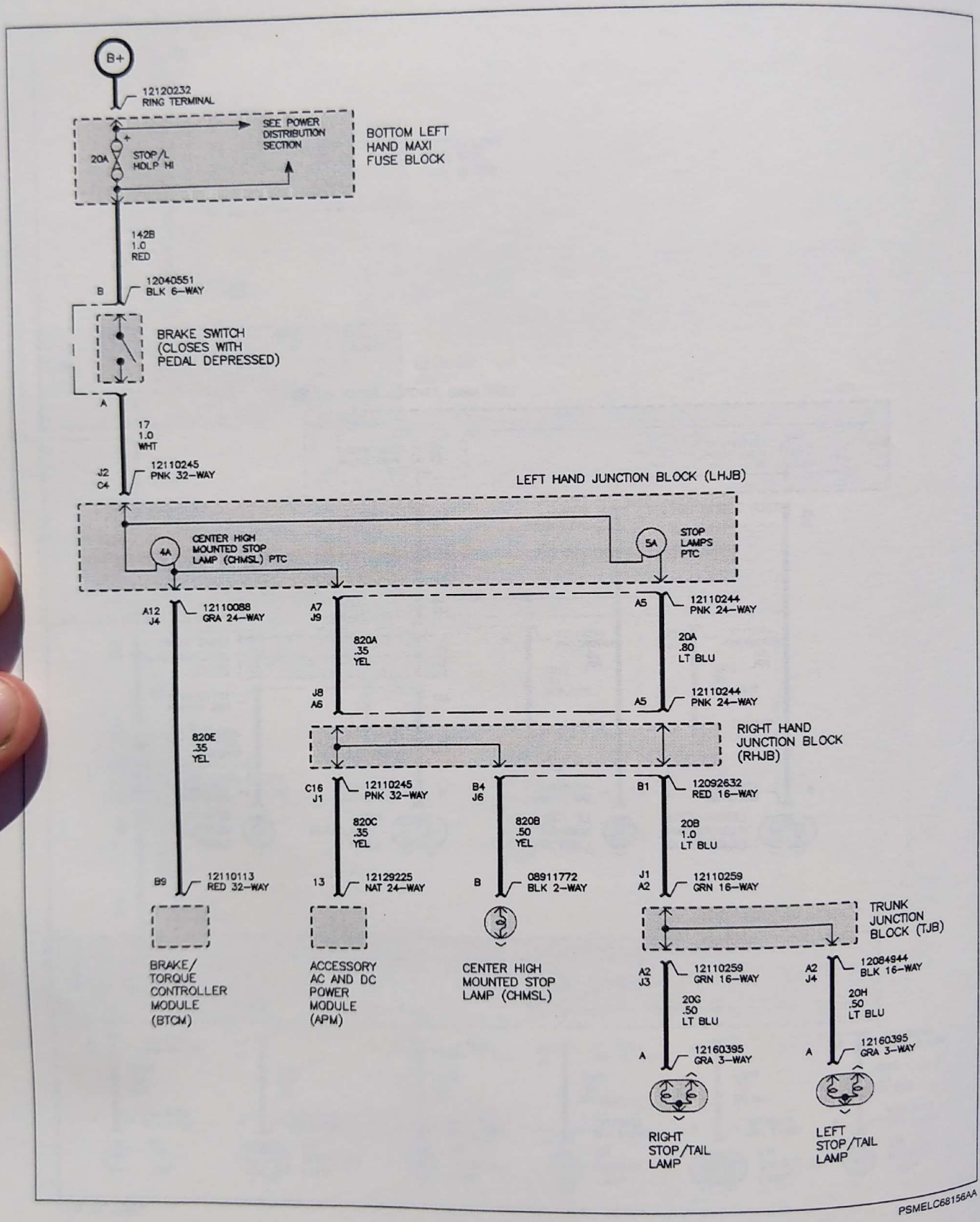
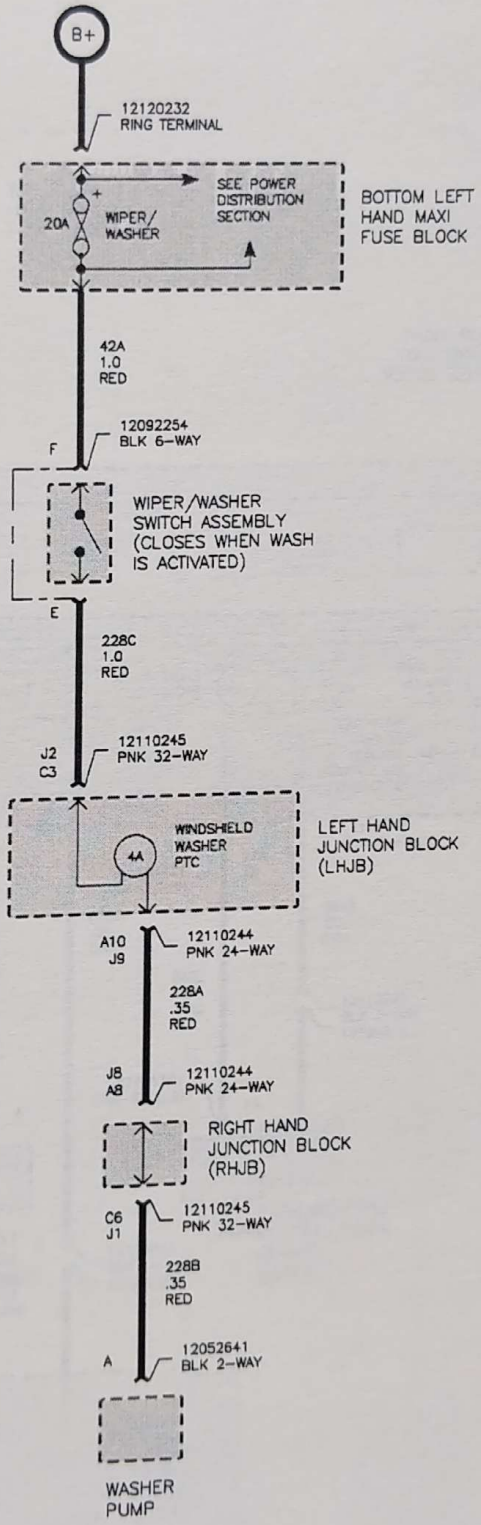

B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION SECTION
20A
STOP/L HDLP HI
BOTTOM LEFT HAND MAXI FUSE BLOCK
142B
1.0
RED
B
12040551
BLK 6-WAY
BRAKE SWITCH (CLOSES WITH PEDAL DEPRESSED)
A
17
1.0
WHT
J2
C4
12110245
PNK 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
4A
CENTER HIGH MOUNTED STOP LAMP (CHMSL) PTC
5A
STOP LAMPS PTC
A12
J4
12110088
GRA 24-WAY
A7
J9
820A
.35
YEL
A5
12110244
PNK 24-WAY
20A
.80
LT BLU
J8
A6
A5
12110244
PNK 24-WAY
820E
.35
YEL
RIGHT HAND JUNCTION BLOCK (RHJB)
C16
J1
12110245
PNK 32-WAY
820C
.35
YEL
B4
J6
820B
.50
YEL
B1
12092632
RED 16-WAY
20B
1.0
LT BLU
B9
12110113
RED 32-WAY
13
12129225
NAT 24-WAY
B
08911772
BLK 2-WAY
J1
A2
12110259
GRN 16-WAY
BRAKE/ TORQUE CONTROLLER MODULE (BTCM)
ACCESSORY AC AND DC POWER MODULE (APM)
CENTER HIGH MOUNTED STOP LAMP (CHMSL)
TRUNK JUNCTION BLOCK (TJB)
A2
J3
12110259
GRN 16-WAY
20G
.50
LT BLU
A
12160395
GRA 3-WAY
A2
J4
12084944
BLK 16-WAY
20H
.50
LT BLU
A
12160395
GRA 3-WAY
RIGHT STOP/TAIL LAMP
LEFT STOP/TAIL LAMP
PSMELC68156AA



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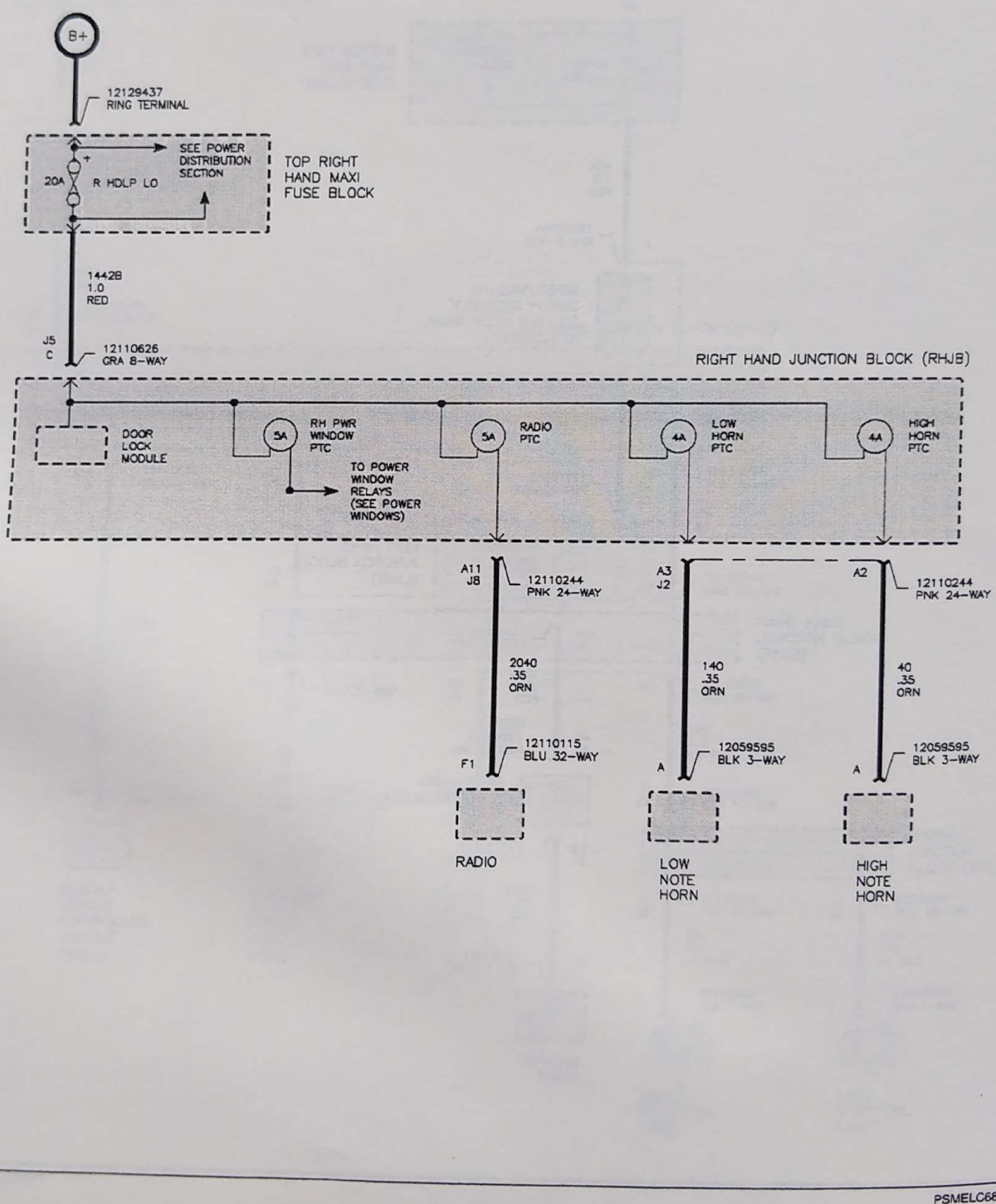

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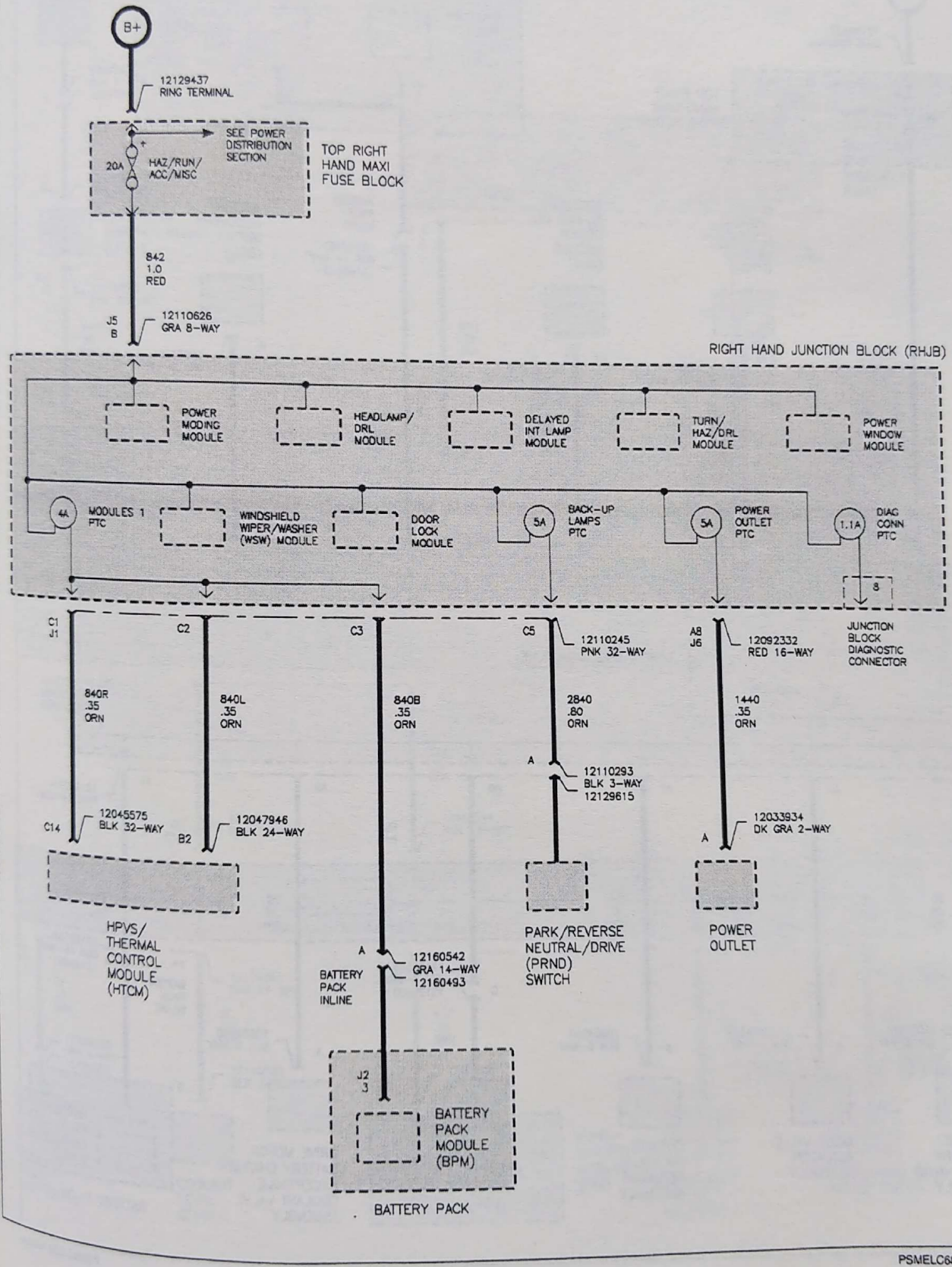

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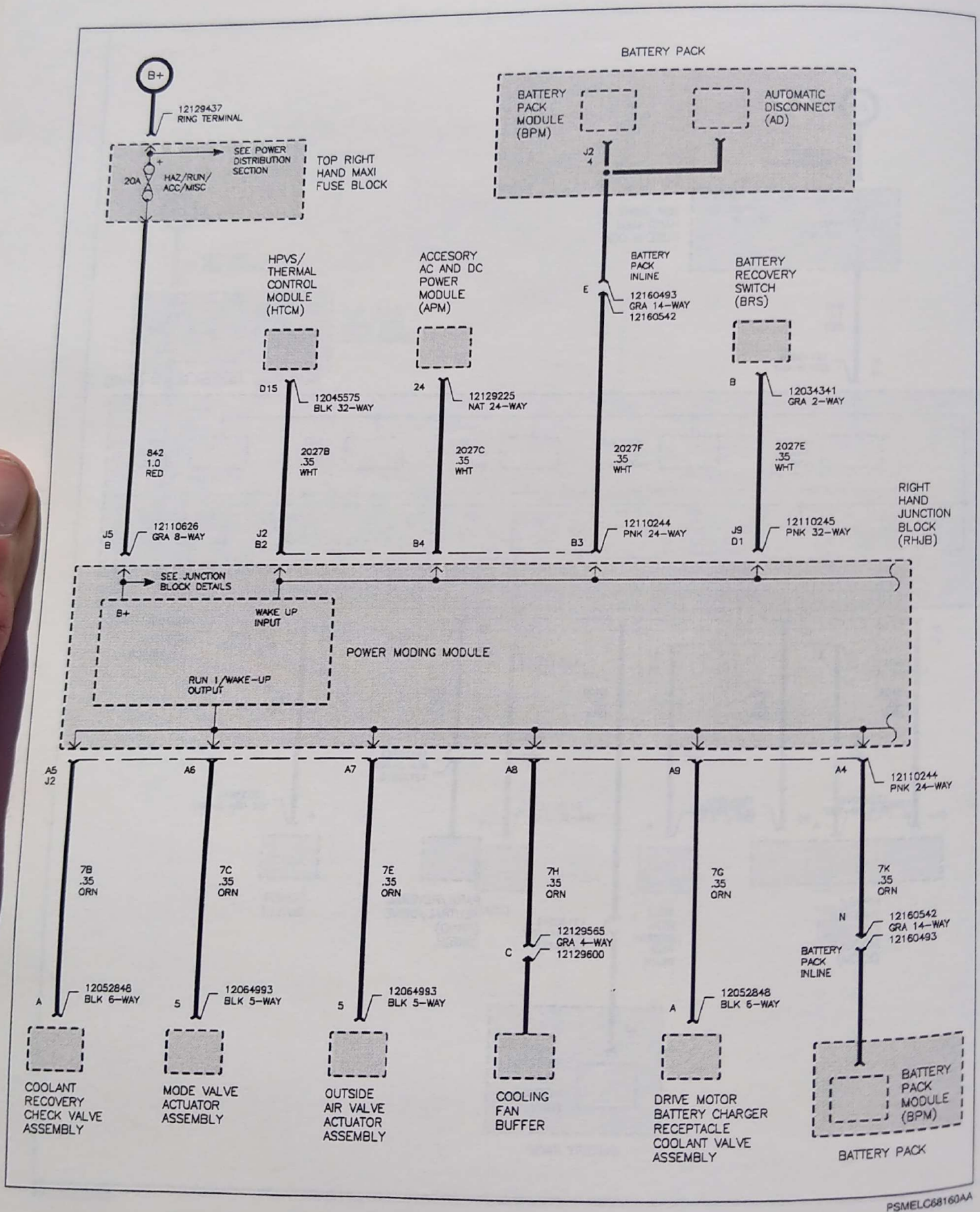
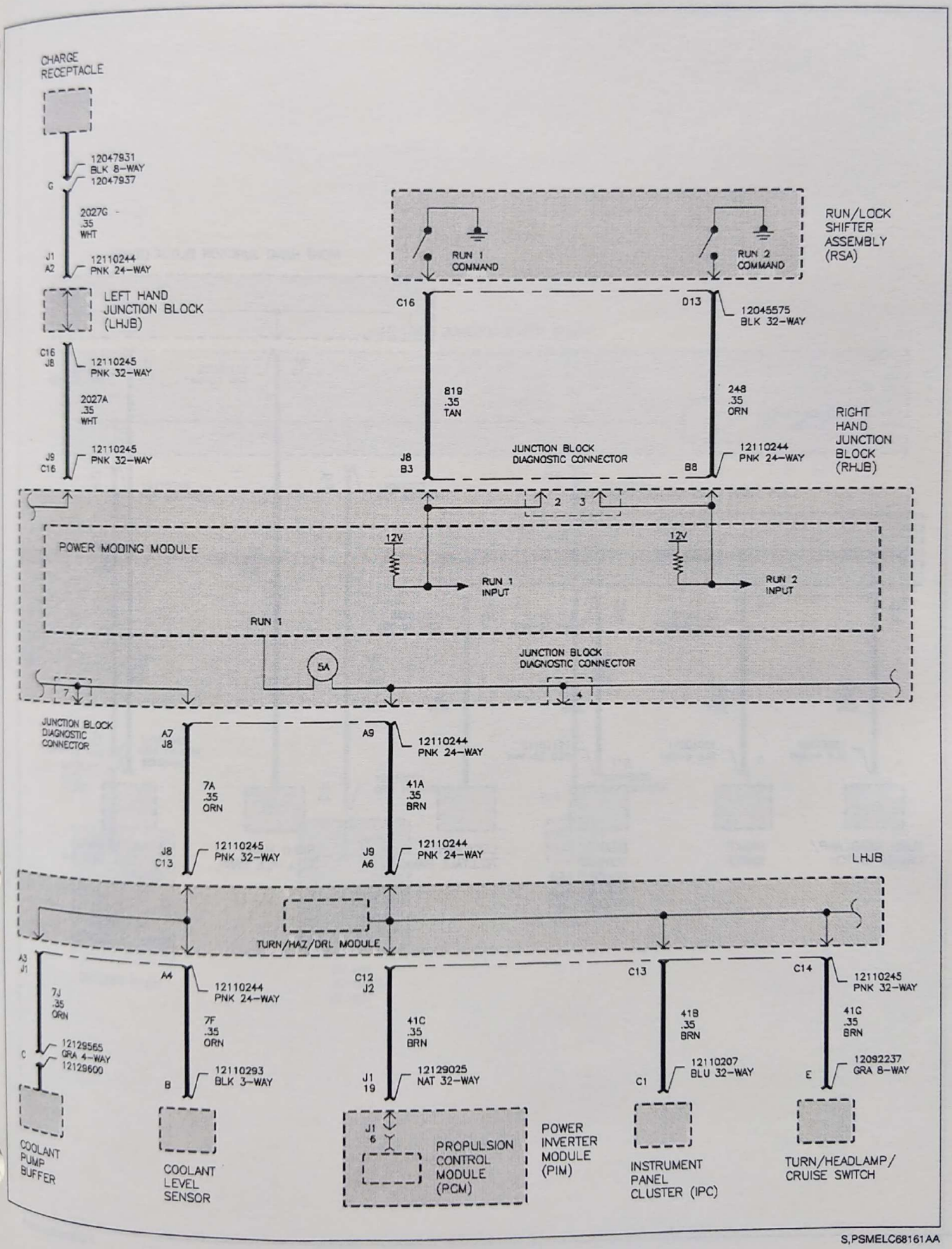
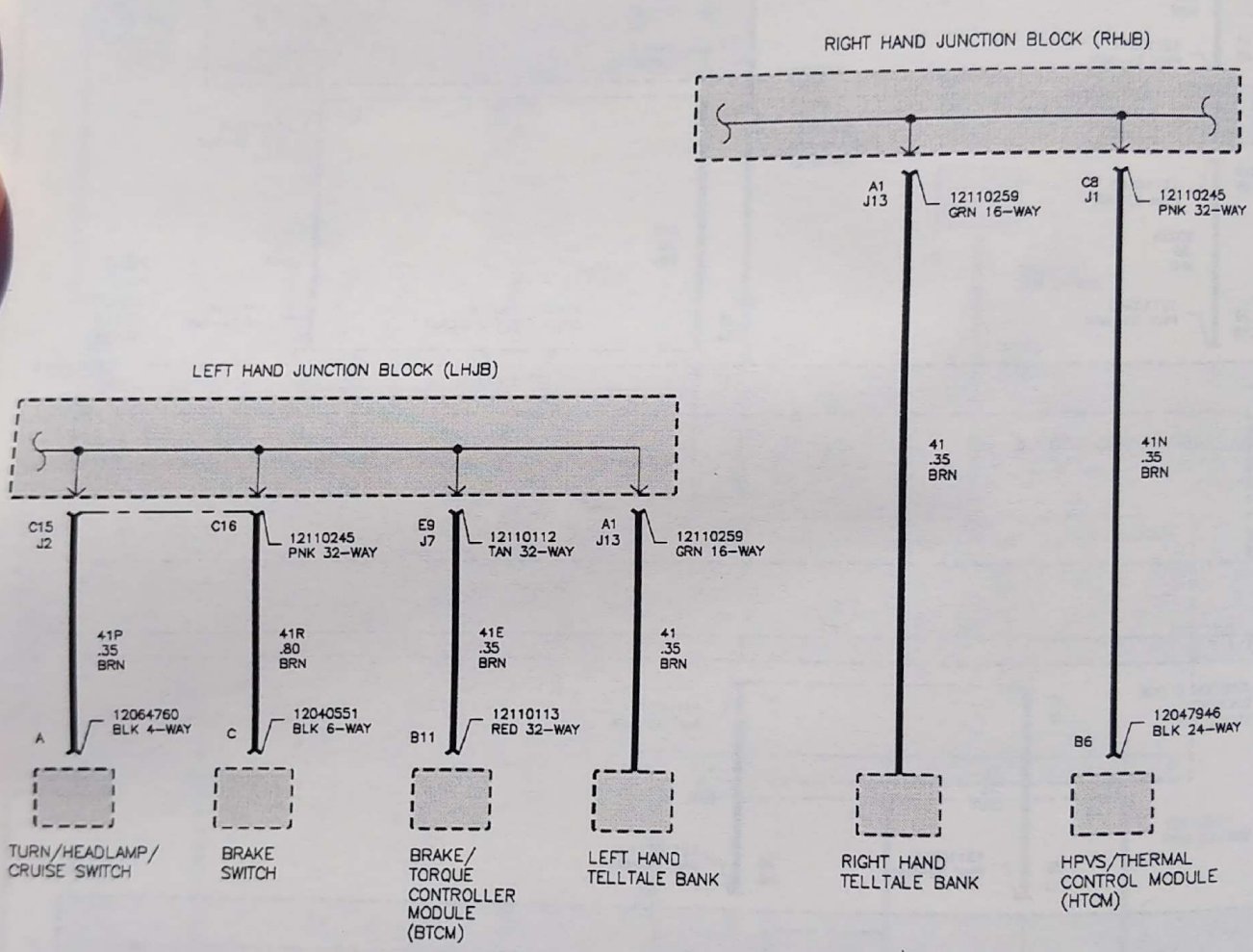

BATTERY PACK
B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION SECTION
20A
HAZ/RUN/ ACC/MISC
TOP RIGHT HAND MAXI FUSE BLOCK
BATTERY PACK MODULE (BPM)
AUTOMATIC DISCONNECT (AD)
J2
4
HPVS/ THERMAL CONTROL MODULE (HTCM)
ACCESORY AC AND DC POWER MODULE (APM)
BATTERY PACK INLINE
E
12160493
GRA 14-WAY
12160542
BATTERY RECOVERY SWITCH (BRS)
D15
12045575
BLK 32-WAY
24
12129225
NAT 24-WAY
B
12034341
GRA 2-WAY
842
1.0
RED
2027B
.35
WHT
2027C
.35
WHT
2027F
.35
WHT
2027E
.35
WHT
RIGHT HAND JUNCTION BLOCK (RHJB)
J5
B
12110626
GRA 8-WAY
J2
B2
B4
B3
12110244
PNK 24-WAY
J9
D1
12110245
PNK 32-WAY
SEE JUNCTION BLOCK DETAILS
B+
WAKE UP INPUT
POWER MODING MODULE
RUN 1/WAKE-UP OUTPUT
A5
J2
A6
A7
A8
A9
A4
12110244
PNK 24-WAY
7B
.35
ORN
7C
.35
ORN
7E
.35
ORN
7H
.35
ORN
7G
.35
ORN
7K
.35
ORN
N
12160542
GRA 14-WAY
12160493
BATTERY PACK INLINE
C
12129565
GRA 4-WAY
12129600
A
12052848
BLK 6-WAY
5
12064993
BLK 5-WAY
5
12064993
BLK 5-WAY
A
12052848
BLK 6-WAY
COOLANT RECOVERY CHECK VALVE ASSEMBLY
MODE VALVE ACTUATOR ASSEMBLY
OUTSIDE AIR VALVE ACTUATOR ASSEMBLY
COOLING FAN BUFFER
DRIVE MOTOR BATTERY CHARGER RECEPTACLE COOLANT VALVE ASSEMBLY
BATTERY PACK MODULE (BPM)
BATTERY PACK
PSMELC68160AA



S,PSMELC68161AA



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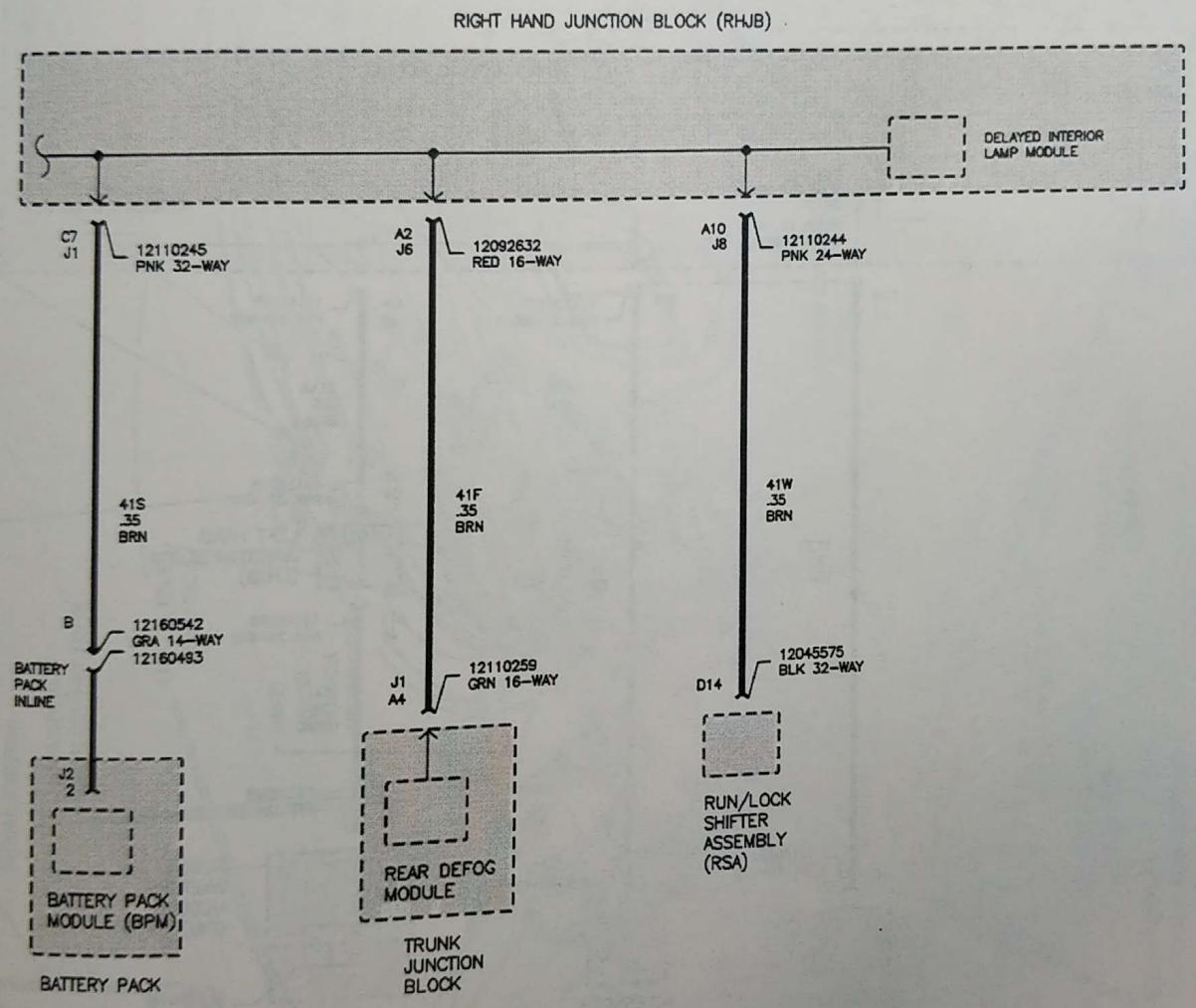

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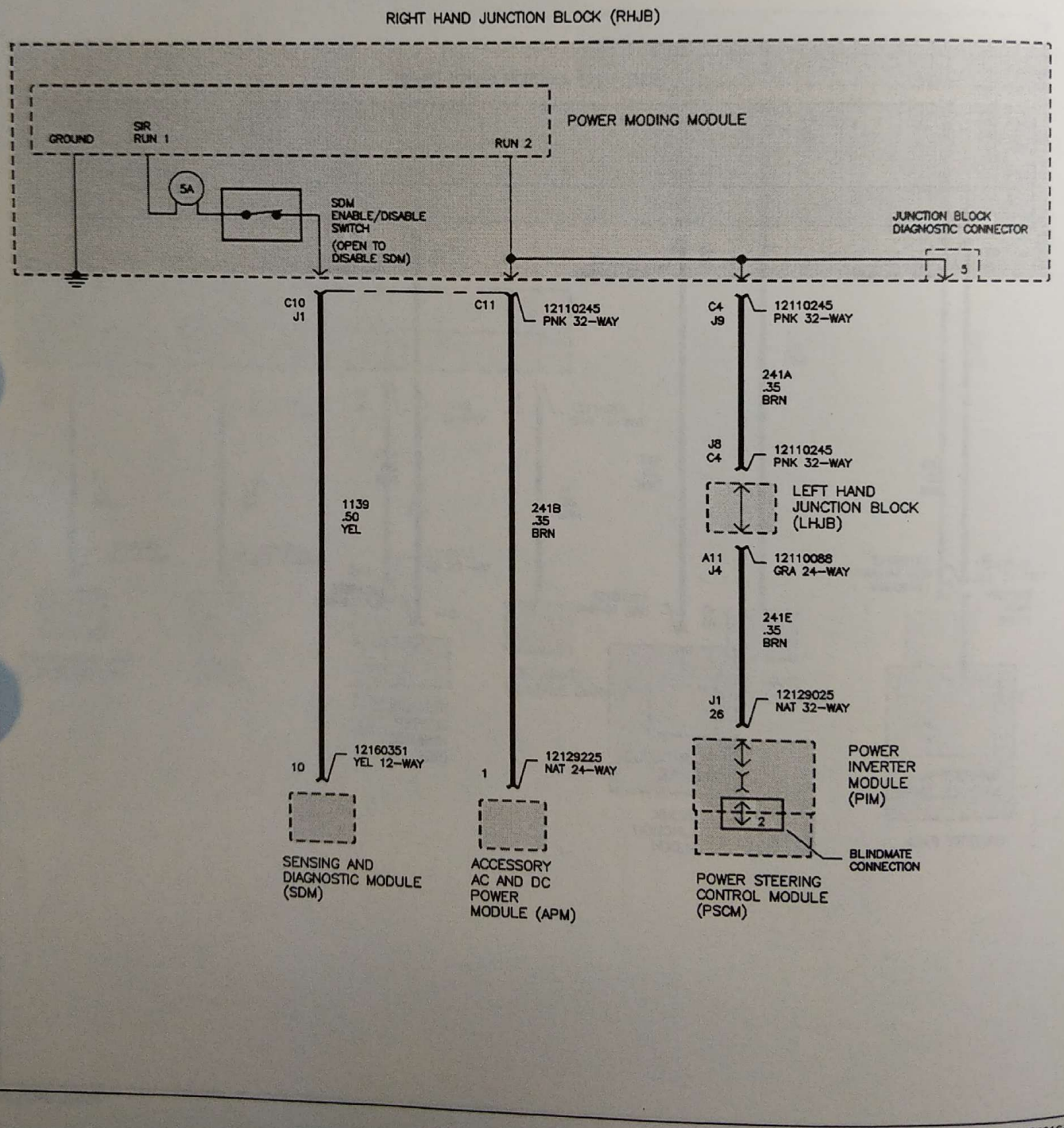
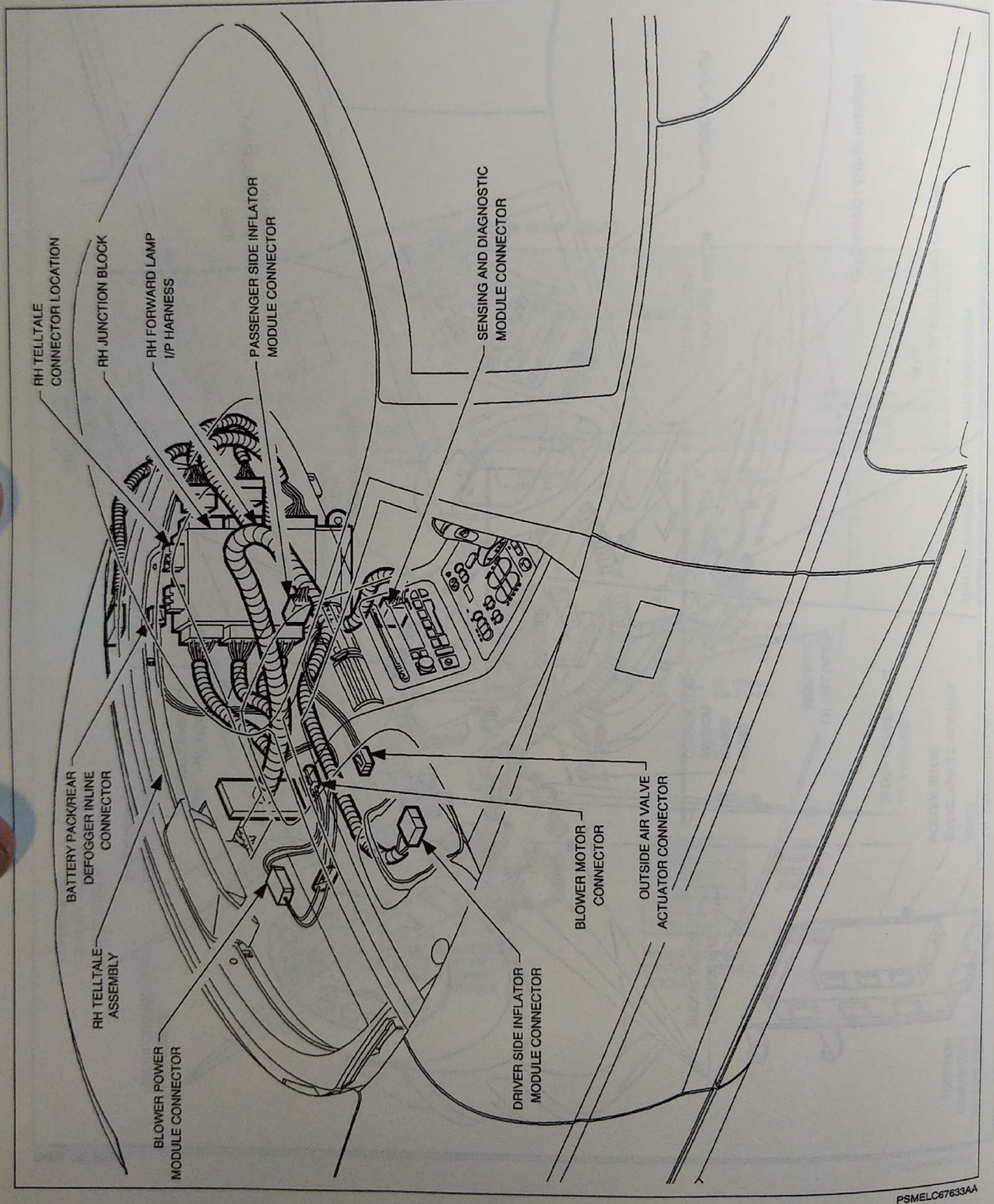


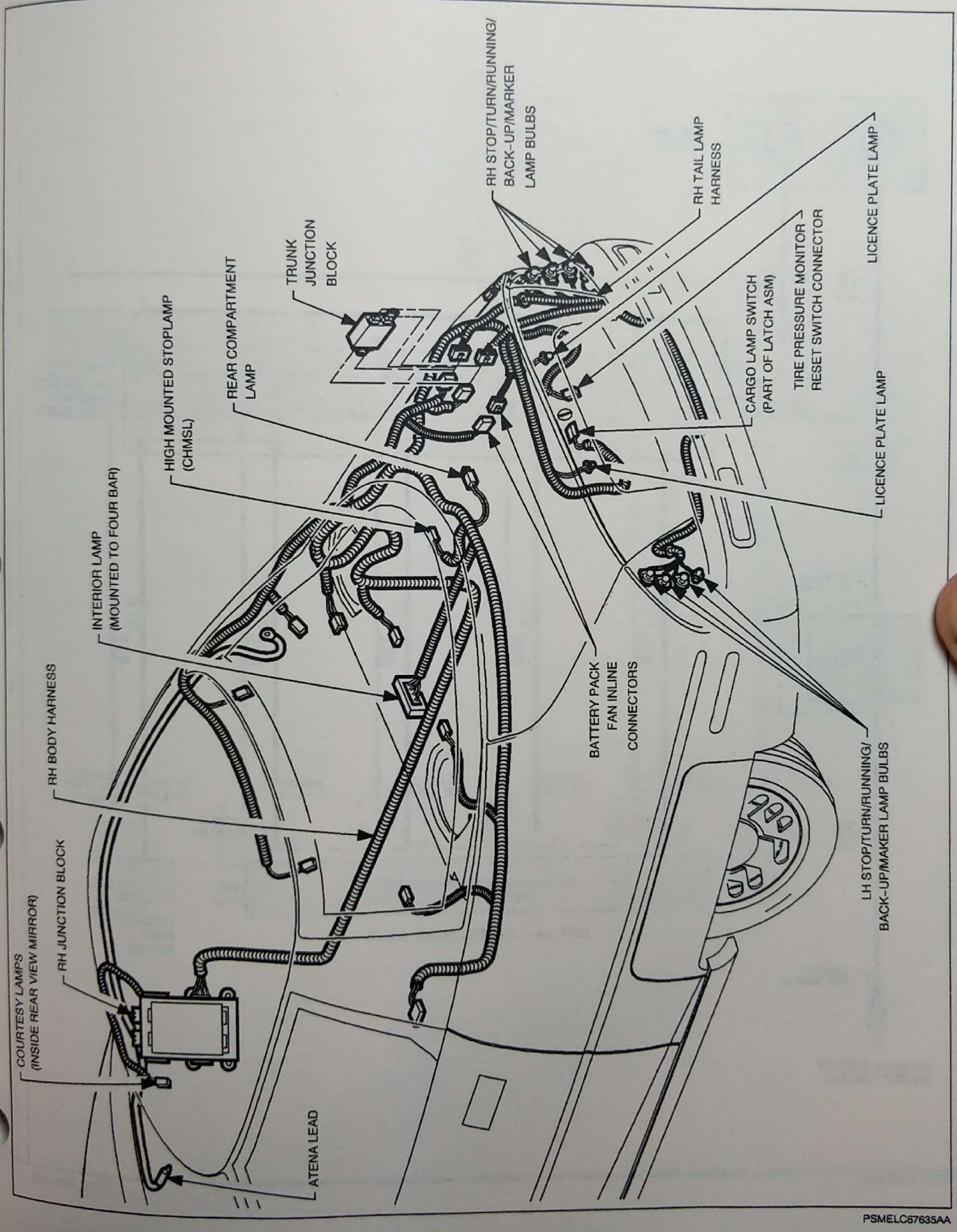
PSMELC68164AA

JUNCTION BLOCK COMPONENT LOCATION VIEWS

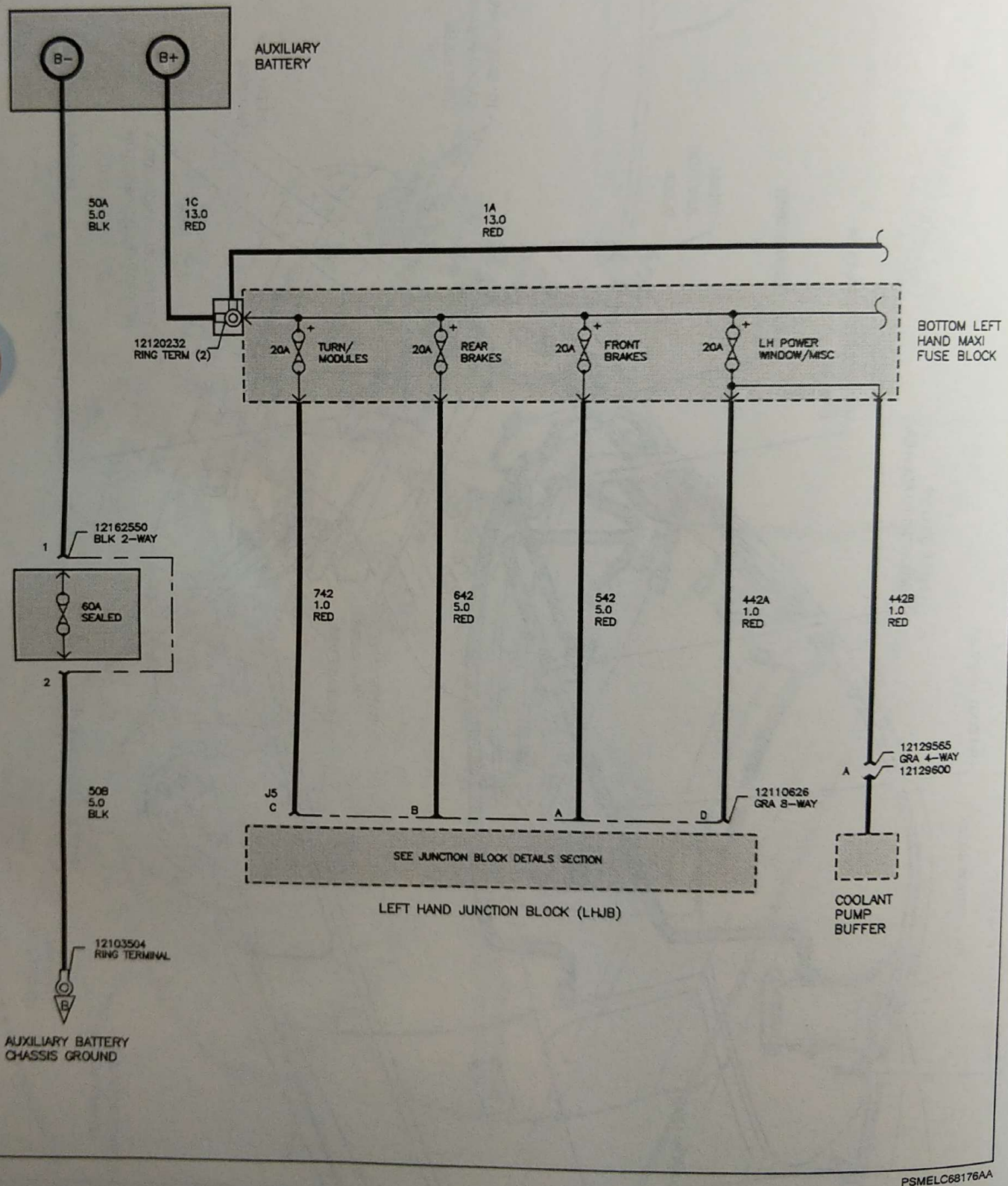
JUNCTION BLOCK COMPONENT LOCATION VIEWS (CONTINUED)



JUNCTION BLOCK COMPONENT LOCATION VIEWS (CONTINUED)



POWER DISTRIBUTION



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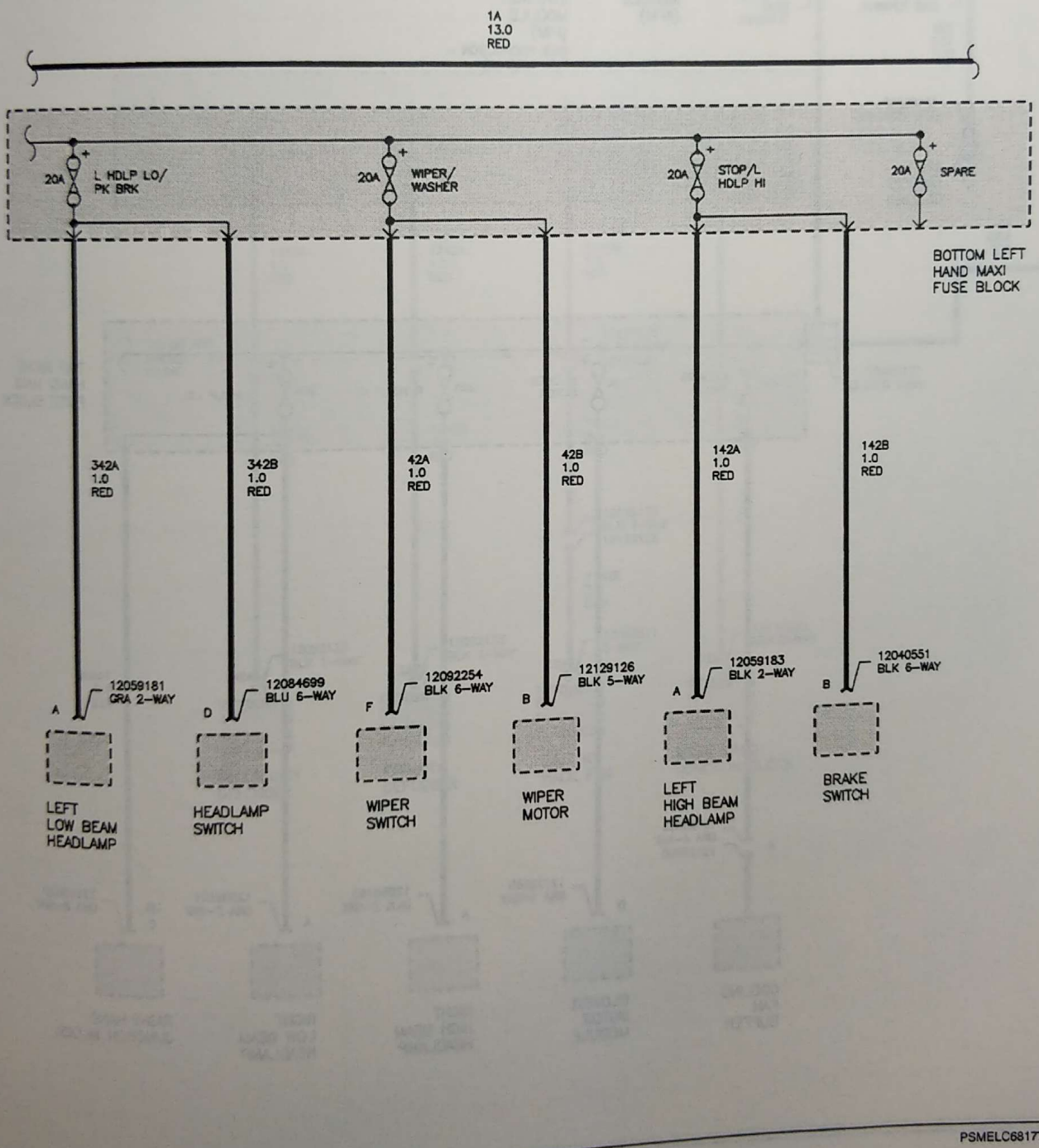
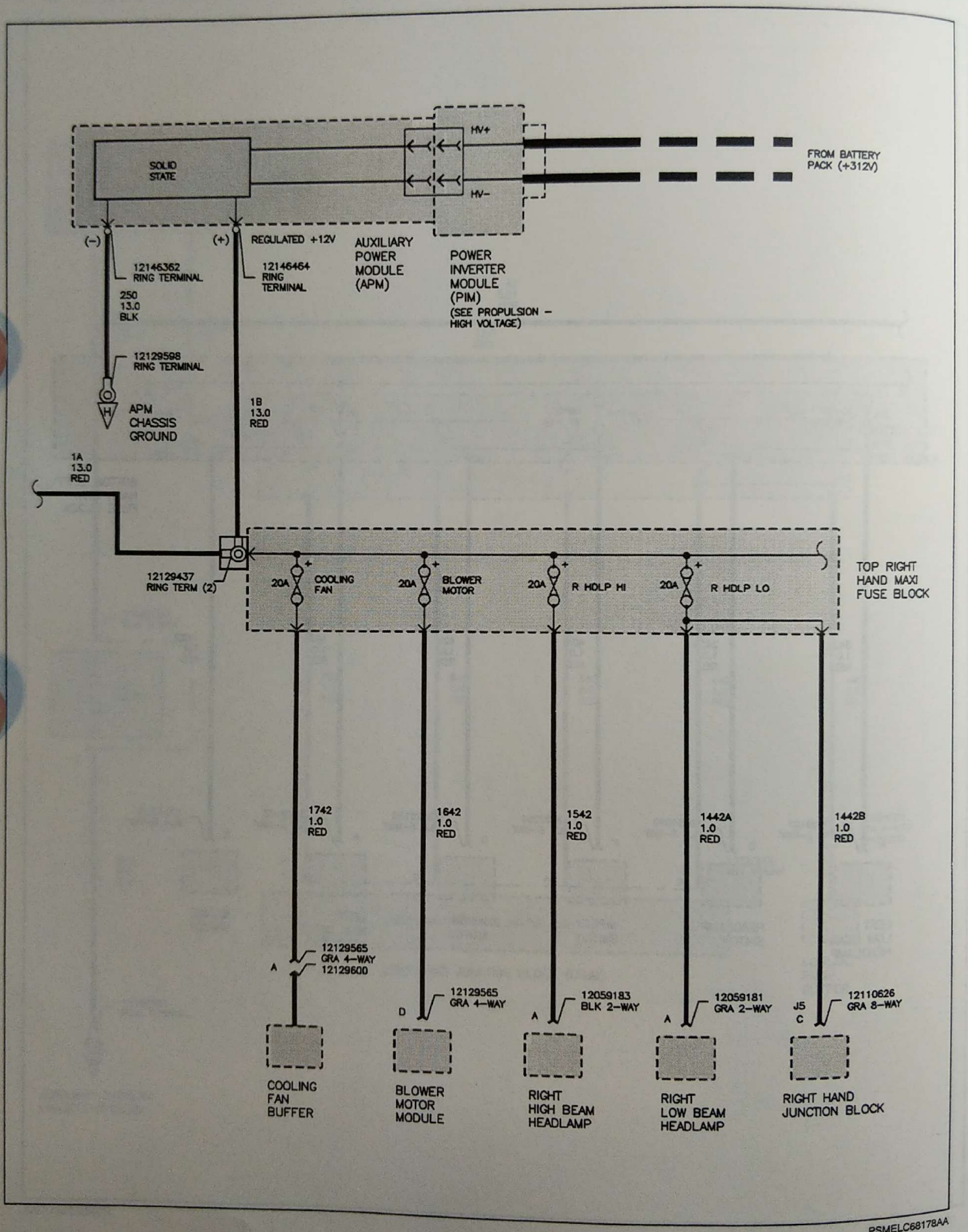
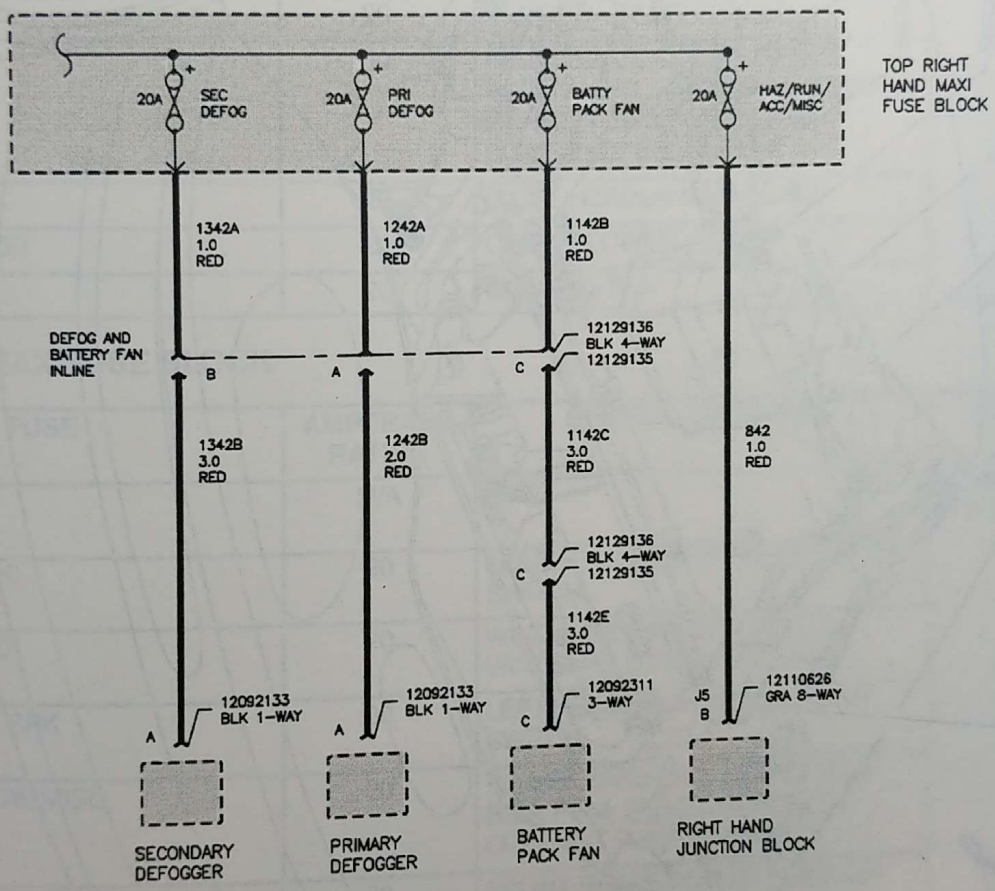
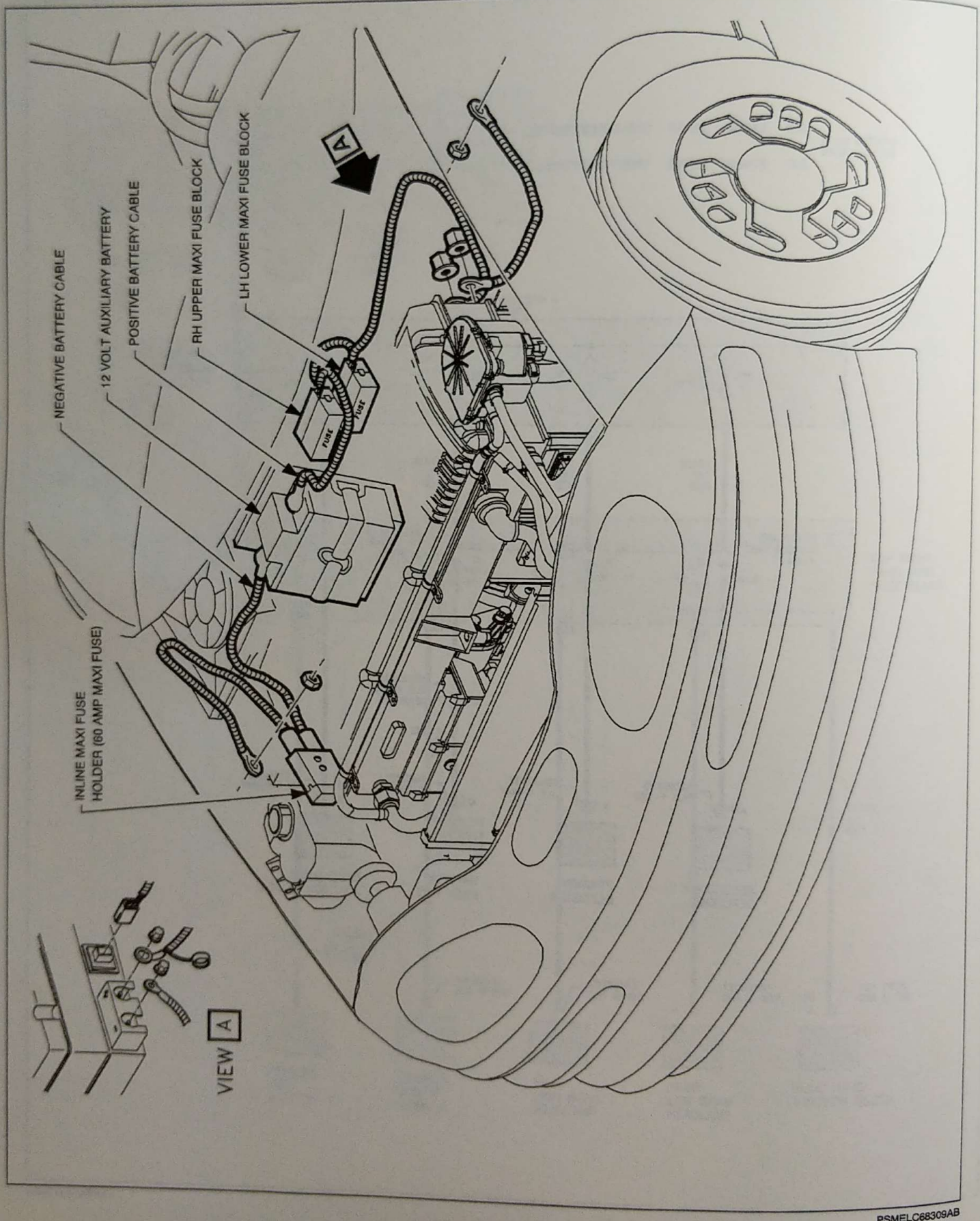

1A
13.0
RED
20A
L HDLP LO/
PK BRK
20A
WIPER/
WASHER
20A
STOP/L
HDLP HI
20A
SPARE
BOTTOM LEFT
HAND MAXI
FUSE BLOCK
342A
1.0
RED
342B
1.0
RED
42A
1.0
RED
42B
1.0
RED
142A
1.0
RED
142B
1.0
RED
A
12059181
GRA 2-WAY
D
12084699
BLU 6-WAY
F
12092254
BLK 6-WAY
B
12129126
BLK 5-WAY
A
12059183
BLK 2-WAY
B
12040551
BLK 6-WAY
LEFT
LOW BEAM
HEADLAMP
HEADLAMP
SWITCH
WIPER
SWITCH
WIPER
MOTOR
LEFT
HIGH BEAM
HEADLAMP
BRAKE
SWITCH
PSMELC68177AA


SOLID STATE
HV+
HV-
FROM BATTERY PACK (+312V)
(-)
(+)
REGULATED +12V
AUXILIARY POWER MODULE (APM)
POWER INVERTER MODULE (PIM)
(SEE PROPULSION - HIGH VOLTAGE)
12146362 RING TERMINAL
250 13.0 BLK
12146464 RING TERMINAL
12129598 RING TERMINAL
APM CHASSIS GROUND
1B 13.0 RED
1A 13.0 RED
12129437 RING TERM (2)
20A COOLING FAN
20A BLOWER MOTOR
20A R HDLP HI
20A R HDLP LO
TOP RIGHT HAND MAXI FUSE BLOCK
1742 1.0 RED
1642 1.0 RED
1542 1.0 RED
1442A 1.0 RED
1442B 1.0 RED
A
12129565 GRA 4-WAY
12129600
D
12129565 GRA 4-WAY
A
12059183 BLK 2-WAY
A
12059181 GRA 2-WAY
J5
C
12110626 GRA 8-WAY
COOLING FAN BUFFER
BLOWER MOTOR MODULE
RIGHT HIGH BEAM HEADLAMP
RIGHT LOW BEAM HEADLAMP
RIGHT HAND JUNCTION BLOCK
PSMELC68178AA



PSMELC68179AA

POWER DISTRIBUTION COMPONENT LOCATION VIEW



POWER DISTRIBUTION

FUSE BLOCK DETAILS

RH UPPER MAXIFUSE BLOCK

FUSE	AMPERAGE RATING	FUSED CIRCUITS	SECTION
HAZ/RUN/ACC/MISC	20	RIGHT HAND JUNCTION BLOCK, RUN1, RUN2, DRL, TURN SIGNAL, BACK UP, INTERIOR LAMPS	POWER DISTRIBUTION
BATTY PACK FAN	20	BATTERY PACK FAN	
PRI DEFOG	20	PRIMARY DEFOGGER	
SEC DEFOG	20	SECONDARY DEFOGGER	
R HDLP LO	20	RIGHT HEADLAMP LO BEAM, RIGHT HAND JUNCTION BLOCK, HORNS POWER WINDOWS, POWER LOCKS, RADIO	
R HDLP HI	20	RIGHT HEADLAMP HI BEAM	
BLOWER MOTOR	20	CABIN BLOWER MOTOR	
COOLING FAN	20	COOLING FAN	

LH LOWER MAXIFUSE BLOCK

FUSE	AMPERAGE RATING	FUSED CIRCUITS	SECTION
SPARE	N/A	N/A	POWER DISTRIBUTION
STOP/L HDLP HI	20	LEFT HEADLAMP HI STOPLAMP SWITCH	
WIPER/WASHER	20	WINDSHIELD WIPER SWITCH, WINDSHIELD WASHER PUMP	
L HDLP LO/ PK BRK	20	LEFT HEADLAMP LO, HEADLAMP SWITCH	
LH PWR WNDOW/MISC	20	POWER WINDOWS, POWER MIRROR, PCM, DLC CONNECTOR, COOLANT PUMP BUFFER	
BRAKES FRONT	20	FRONT BRAKE POWER FEED (LH JUNCTION BLOCK)	
BRAKES REAR	20	REAR BRAKE POWER FEED (LH JUNCTION BLOCK)	
TURN/MODULES	20	RUN/LOCK SHIFTER ASSEMBLY, LEFT DRL, LEFT TURN, RADIO, BACK UP LAMPS, DIMMER, OIL PUMP, HORN PAD, CHARGE RECEPTICAL, DOOR LOCKS, PROPULSION CONTROL MODULE, BRAKE TORQUE CONTROL MODULE	

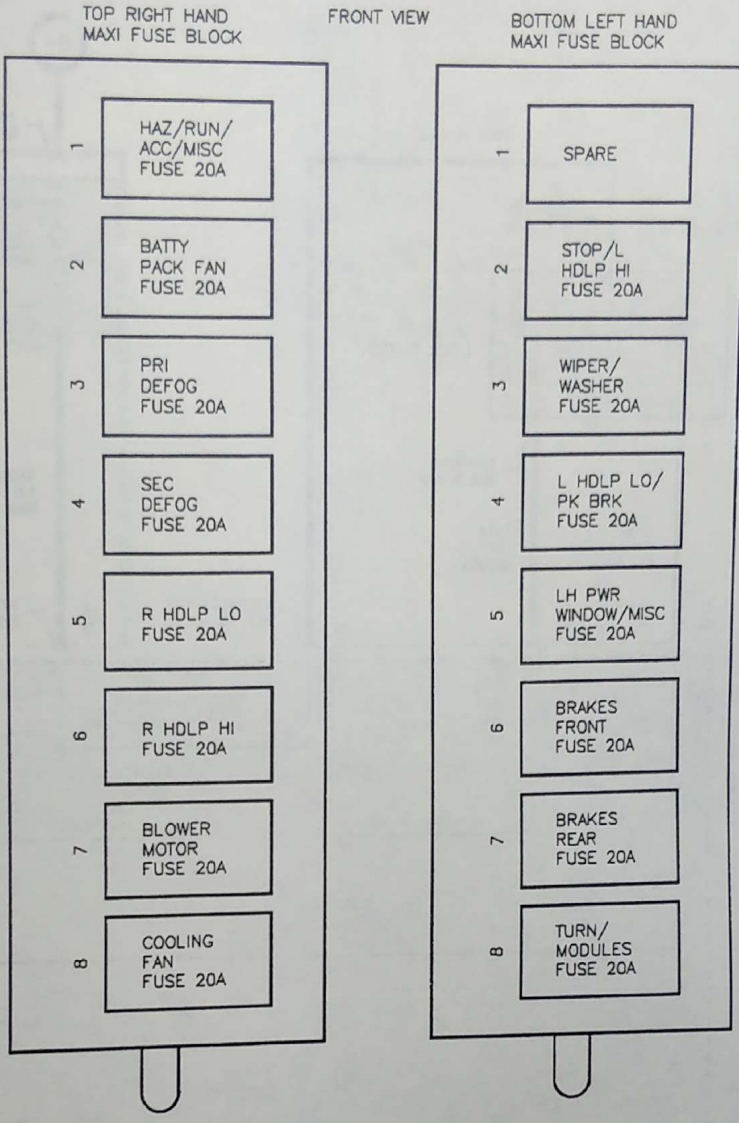
CamScanner

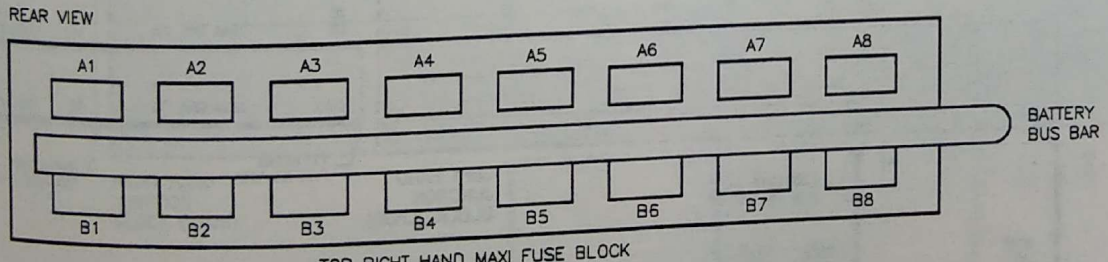
CIRCUIT AND CAVITY LOCATION

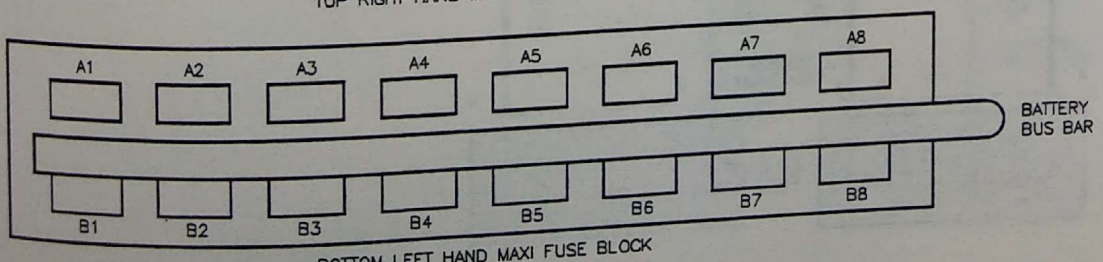
RH UPPER MAXIFUSE BLOCK				LH LOWER MAXIFUSE BLOCK			
CAVITY	CIRCUIT	CAVITY	CIRCUIT	CAVITY	CIRCUIT	CAVITY	CIRCUIT
A1	SPARE	B1	B+	A1	842	B1	B+
A2	142A/142B	B2		A2	1142B	B2	
A3	42A/42B	B3		A3	1242A	B3	
A4	342A/342B	B4	1	A4	1342A	B4	3
A5	442A/442B	B5		A5	1442A/1442B	B5	
A6	542	B6		A6	1542	B6	
A7	642	B7		A7	1642	B7	
A8	742	B8		A8	1742	B8	

CamScanner

FUSE COLOR/RATING	
COLOR	AMPS
TAN	5
BROWN	7.5
RED	10
BLUE	15
YELLOW	20
WHITE	25
GREEN	30
AMBER	40
RED	50
BLUE	60
BROWN	70
NATURAL	80

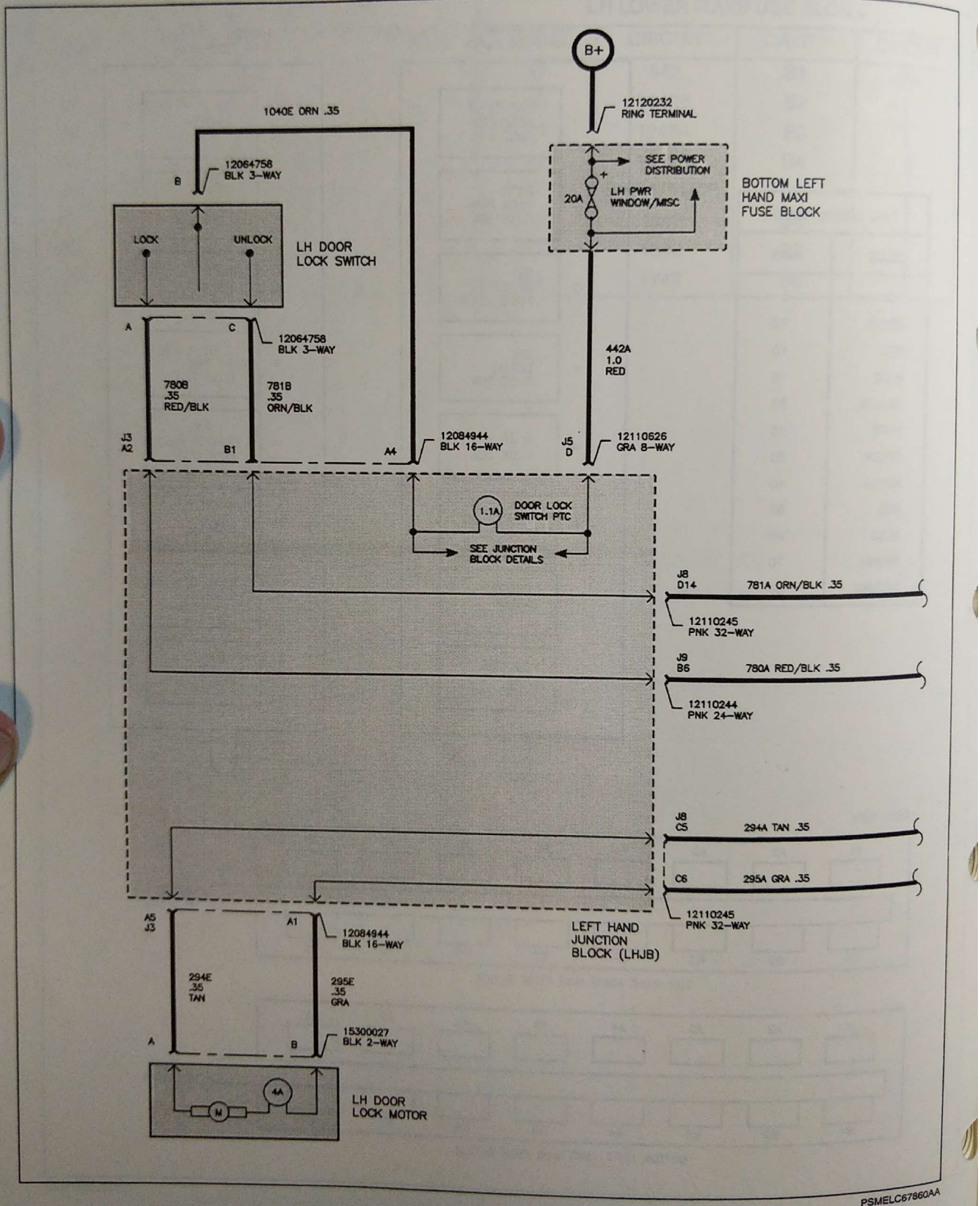


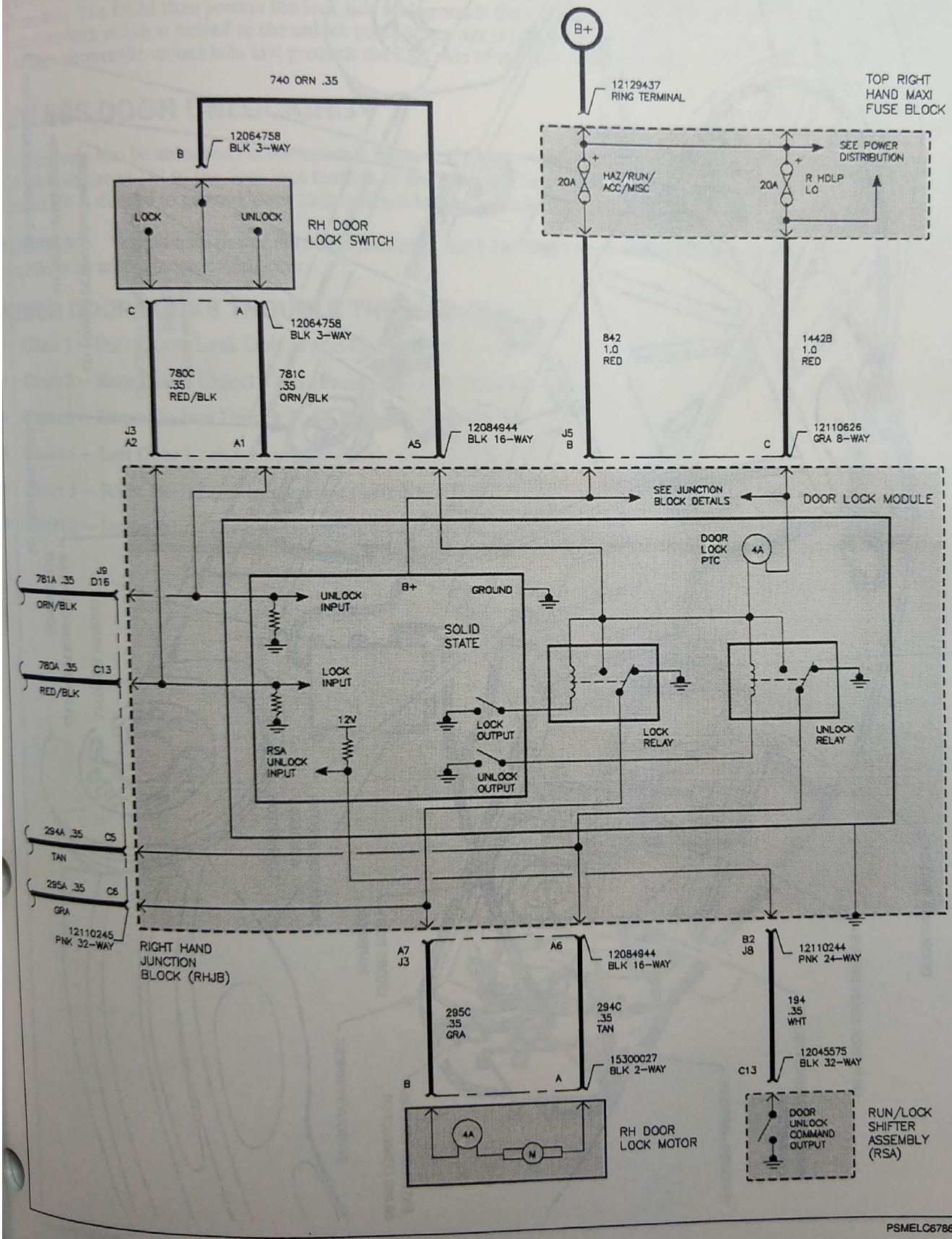




PSMELC68113AA

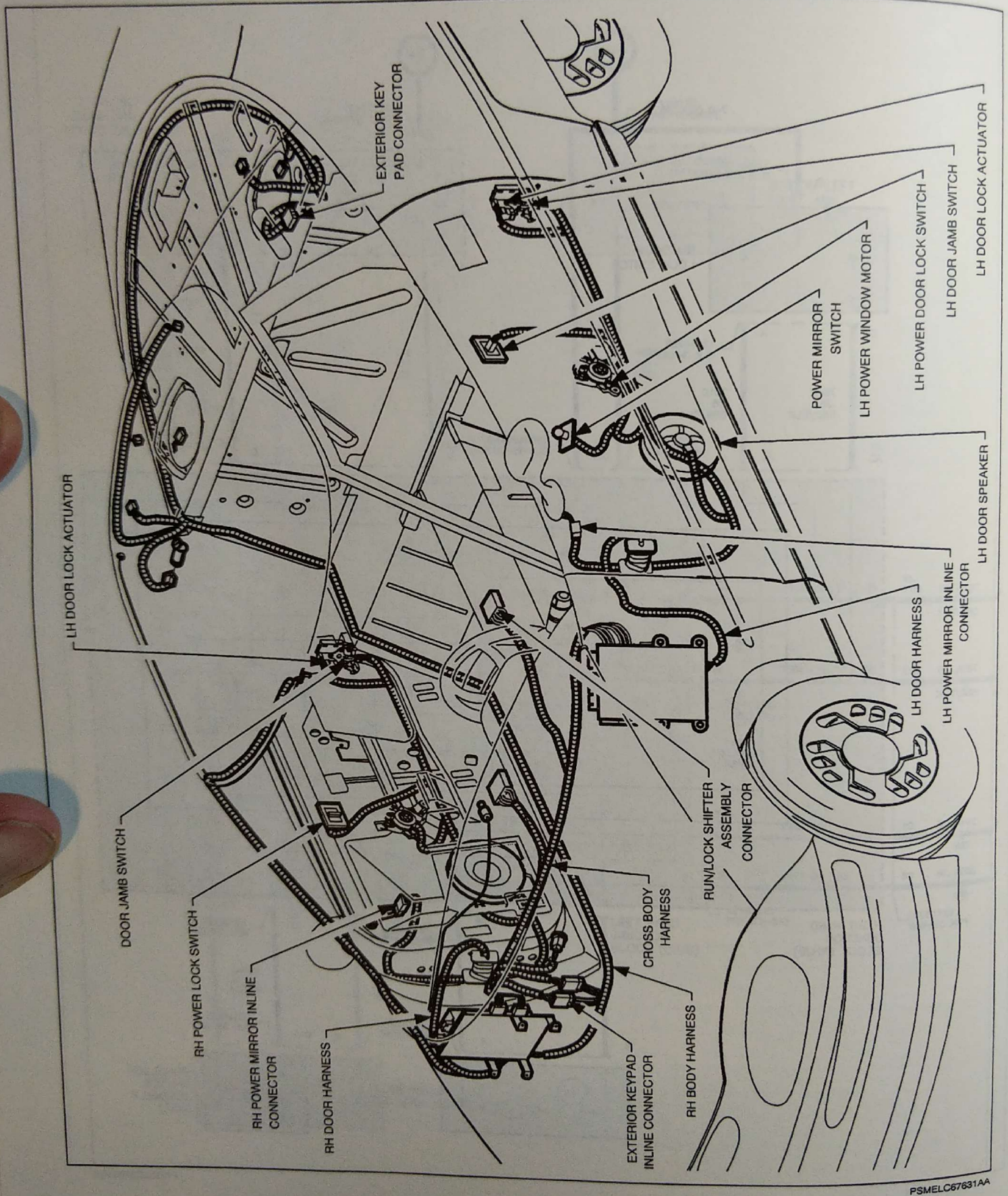
POWER DOOR LOCKS





PSMELC67861AB

POWER DOOR LOCKS COMPONENT LOCATION VIEW



POWER DOOR LOCKS

The power door locks are controlled by the door lock module (DLM), located inside the right hand junction block (RHJB). When either power door lock switch is moved to the lock position, power is sent over circuit 780 to the door lock module. The DLM then powers the lock side and grounds the unlock side of the door lock actuators. When either power door lock switch is moved to the unlock position, power is sent over circuit 781 to the door lock module. The DLM then powers the unlock side and grounds the lock side of the door lock actuators.

KEYLESS DOOR UNLOCKING

The doors may also be unlocked via the external keypad. If the correct keycode is entered on the external keypad, the RSA grounds circuit 194 to the door lock module in the RHJB. When circuit 194 is grounded, both doors are unlocked. If circuit 194 is shorted to ground, door locks will not lock or unlock from either switch.

IMPORTANT: Verify which power door lock functions work and don't work before selecting the appropriate trouble tree, otherwise misdiagnosis could occur.

POWER DOOR LOCKS TROUBLE TREE INDEX

- Chart 1 – Both Doors Lock Only (From One or Both Switches)
- Chart 2 – Both Doors Unlock Only (From One or Both Switches)
- Chart 3 – Doors Do Not Unlock From External Keypad
- Chart 4 – Left Door Lock Inoperative (Right Side OK)
- Chart 5 – Right Door Lock Inoperative (Left Side OK)
- Chart 6 – Doors Won't Lock or Unlock From One or Both Switches

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BOTH DOORS LOCK ONLY (FROM ONE OR BOTH SWITCHES)

CHART 1

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Both doors lock only (from one or both switches).

Both switches inoperative

Left switch inoperative only

Backprobe LHJB J3 pin B1 with door lock held-is there battery voltage?

No

- Check circuit 781B for open from door lock switch pin C to LHJB J3 pin B1.
- If circuit ok, replace door lock switch.

Yes

Backprobe RHJB J9 pin D16 with door unlock held. Is battery voltage present?

No

- Check circuit 781A for open from RHJB J9 pin D16 to LHJB J8 pin D14.
- If circuit ok, replace LHJB.

Yes

Replace RHJB.

Right switch inoperative only

Backprobe pin A of door lock switch with unlock pressed - is there battery voltage?

No

Replace door lock switch.

Yes

- Check circuit 781C for open from door lock switch pin A to RHJB J3 pin A1.
- If circuit ok, replace RHJB.

Backprobe RHJB J3 pin A2 - is there battery voltage?

Yes

Disconnect LHJB J3 connector - is battery voltage still present on A2?

Yes

Disconnect RHJB connector J9 - is battery voltage still present on J3 pin A2?

Yes

- Check for short to voltage on circuit 244 from lock switch pin C to RHJB J3 pin A2.
- Check for passenger door lock switch lock contacts shorted.
- If circuit ok, replace RHJB.

No

- Check for short to voltage on circuit 780B from lock switch pin C to LHJB J3 pin A2.
- If circuit ok, replace door lock switch for lock contacts shorted.

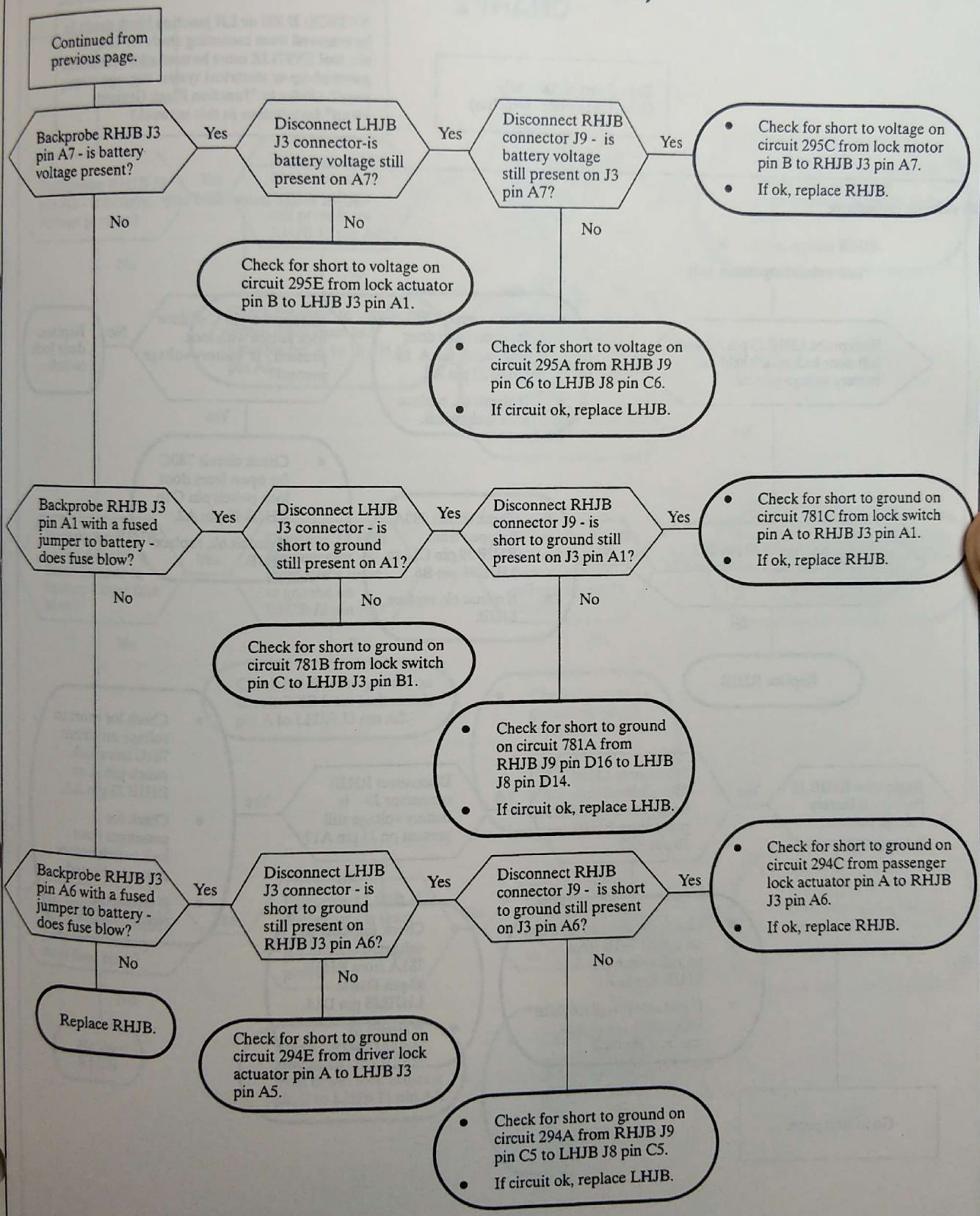
No

- Check for short to voltage on circuit 780A from RHJB J9 pin C13 to LHJB J9 pin B6.
- If circuit ok, replace LHJB.

No

Go to next page.

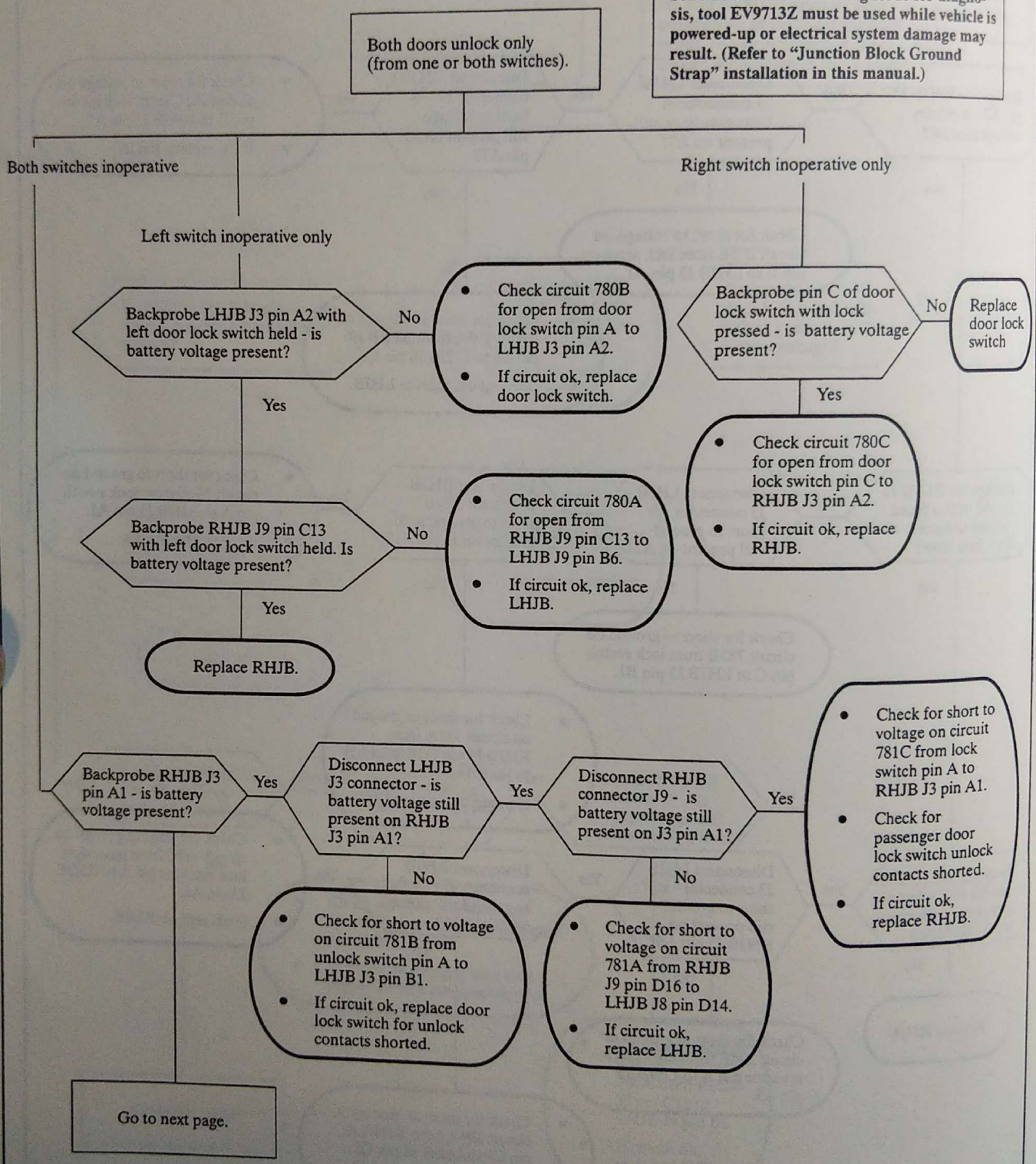
BOTH DOORS LOCK ONLY (FROM ONE OR BOTH SWITCHES)
CHART 1 – (CONTINUED)



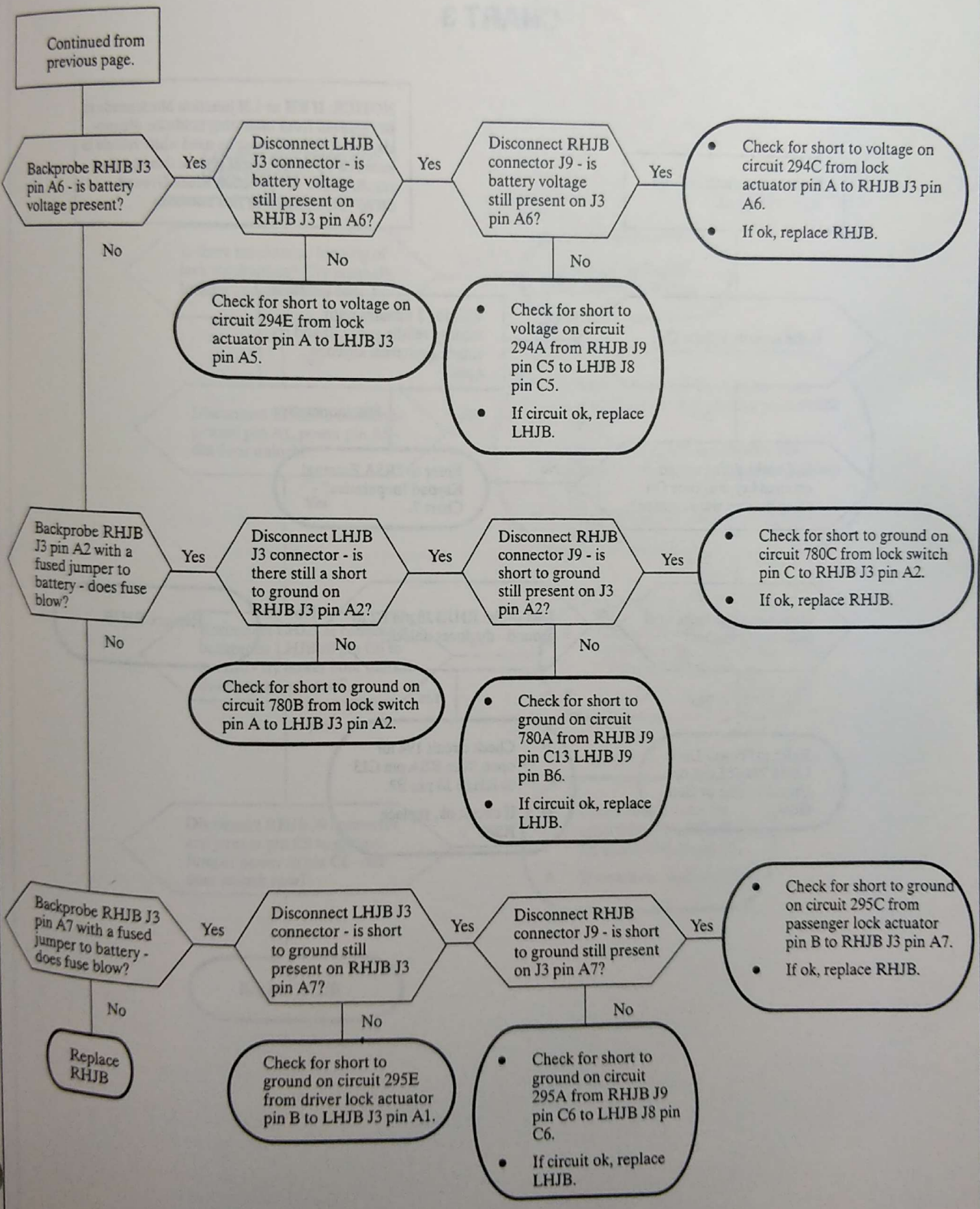
BOTH DOORS UNLOCK ONLY (FROM ONE OR BOTH SWITCHES)

CHART 2

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

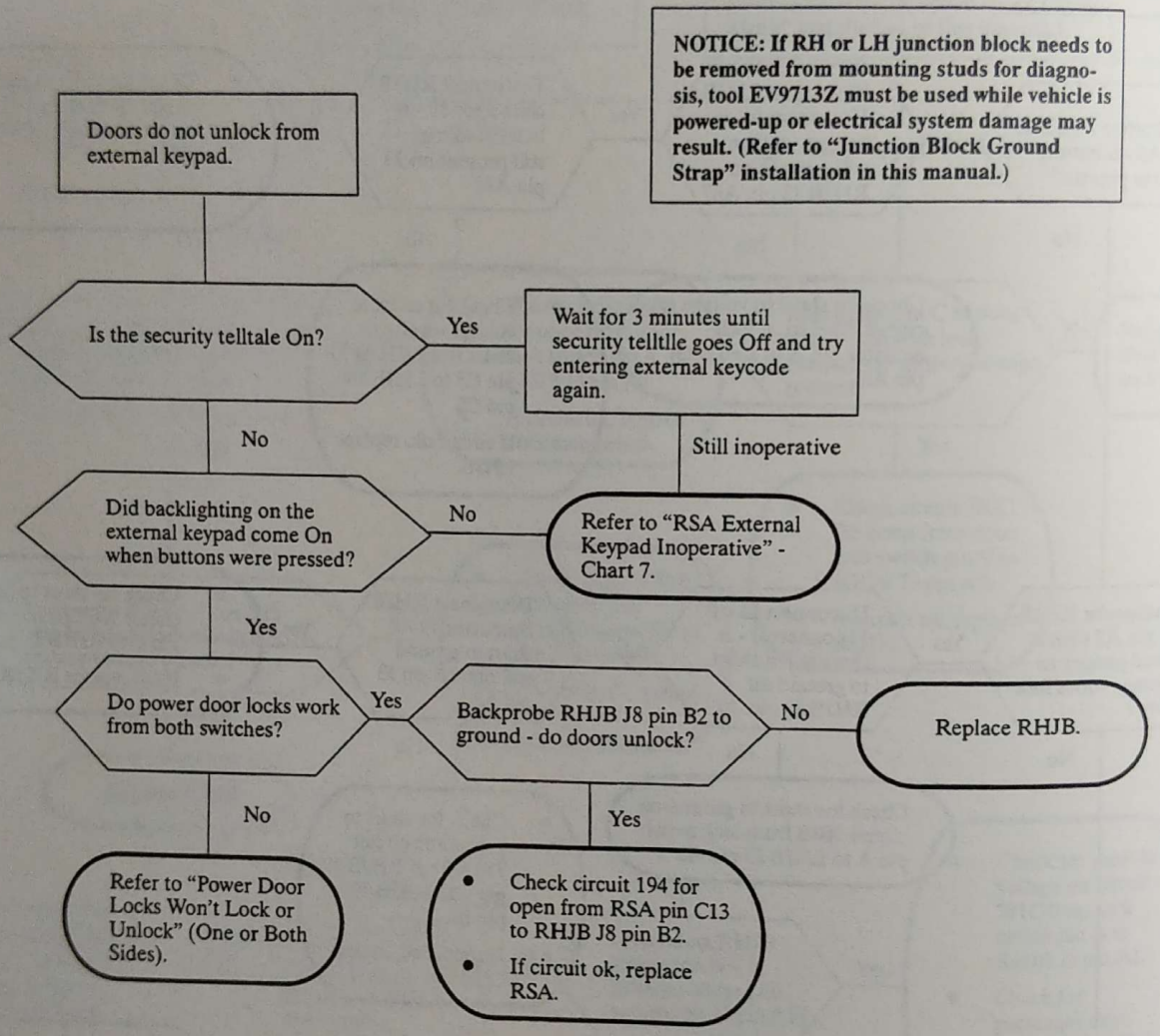


BOTH DOORS UNLOCK ONLY (FROM ONE OR BOTH SWITCHES) CHART 2 (CONTINUED)



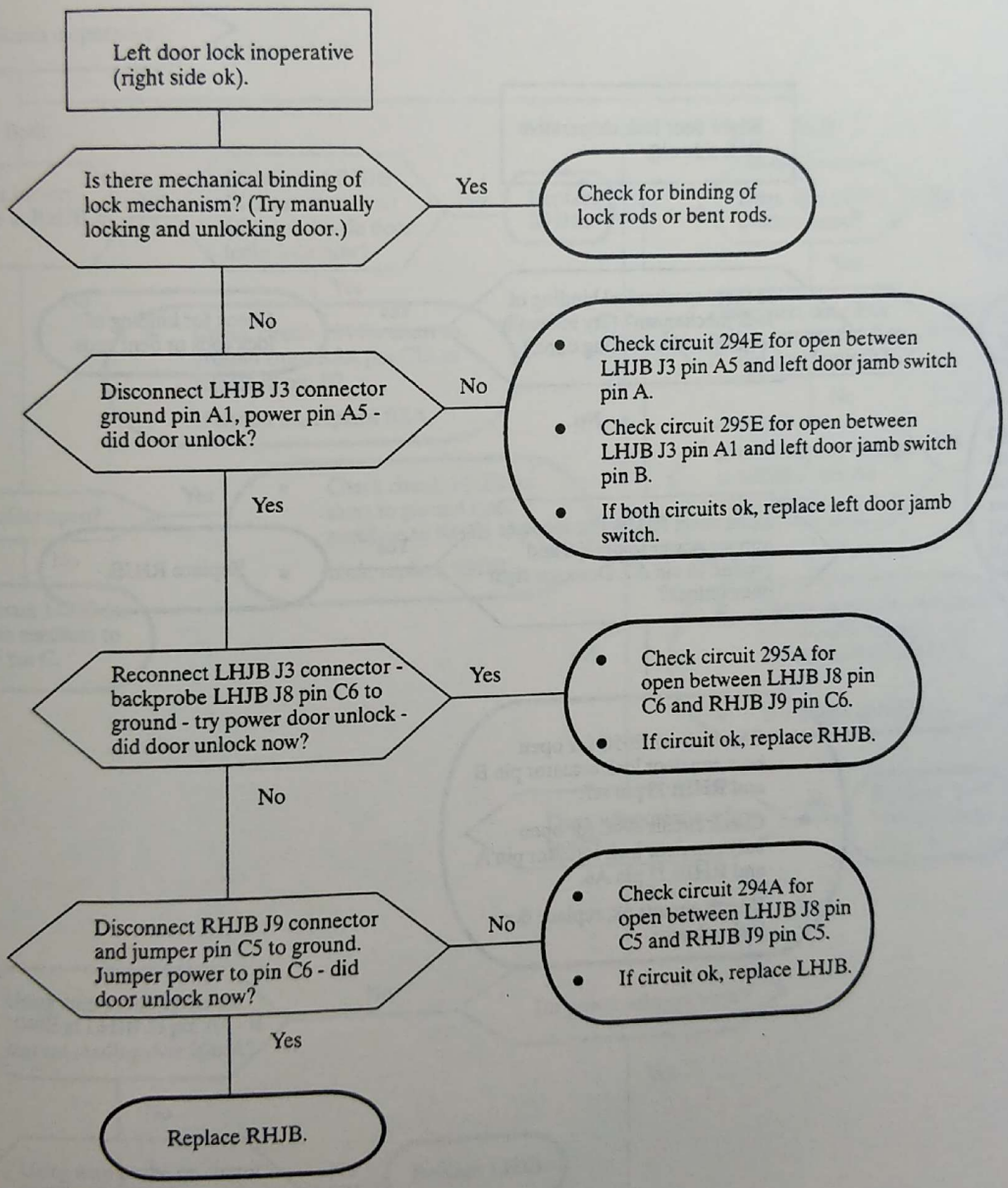
DOORS DO NOT UNLOCK FROM EXTERNAL KEYPAD

CHART 3



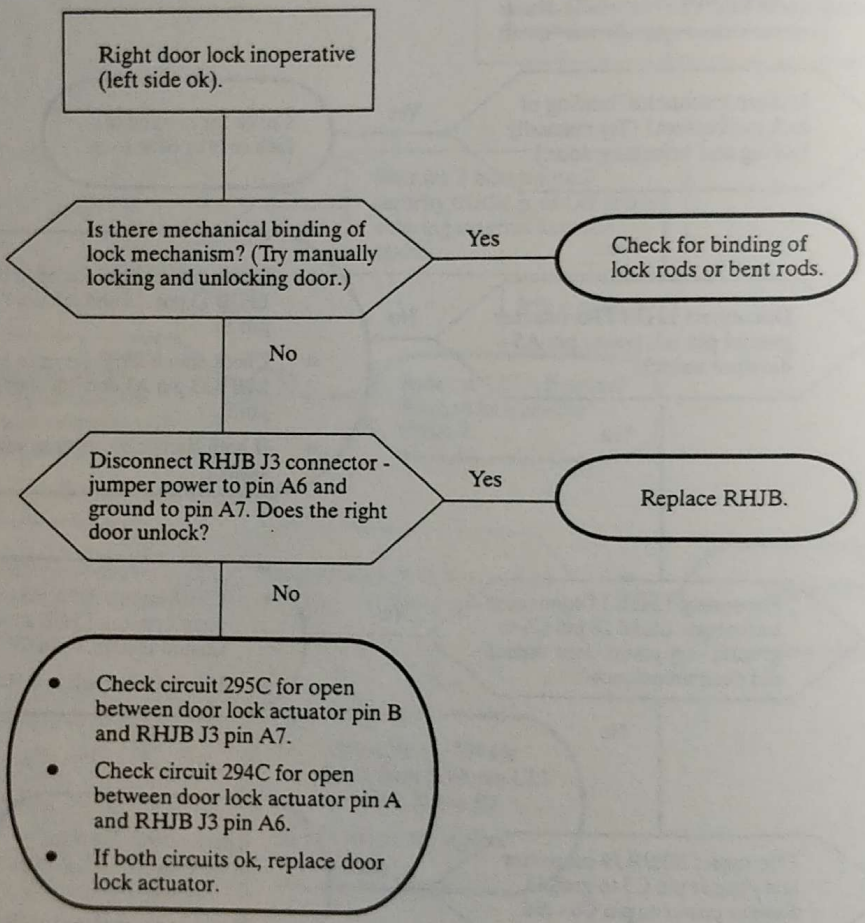
LEFT DOOR LOCK INOPERATIVE (RIGHT SIDE OK)

CHART 4



RIGHT DOOR LOCK INOPERATIVE (LEFT SIDE OK)

CHART 5



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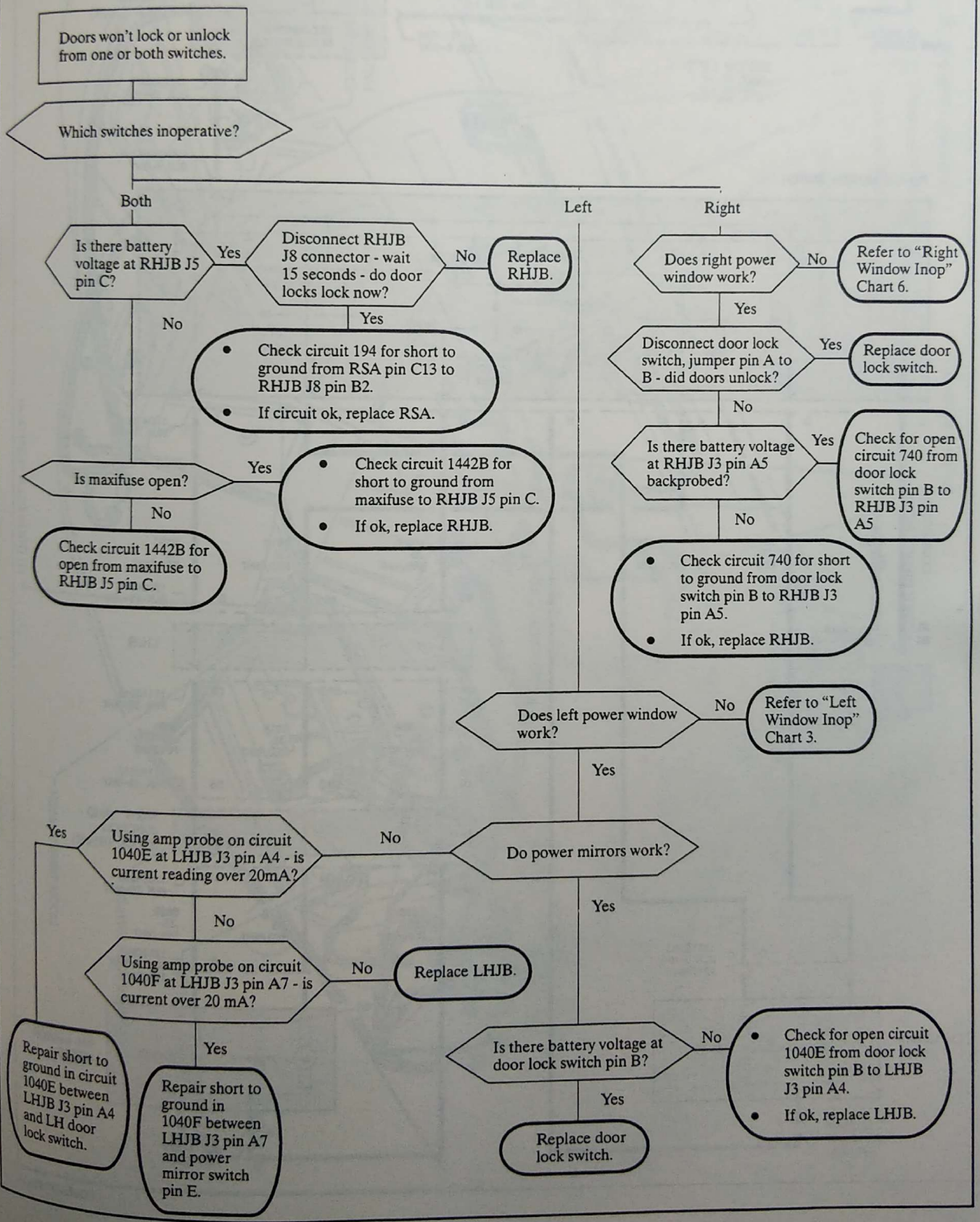
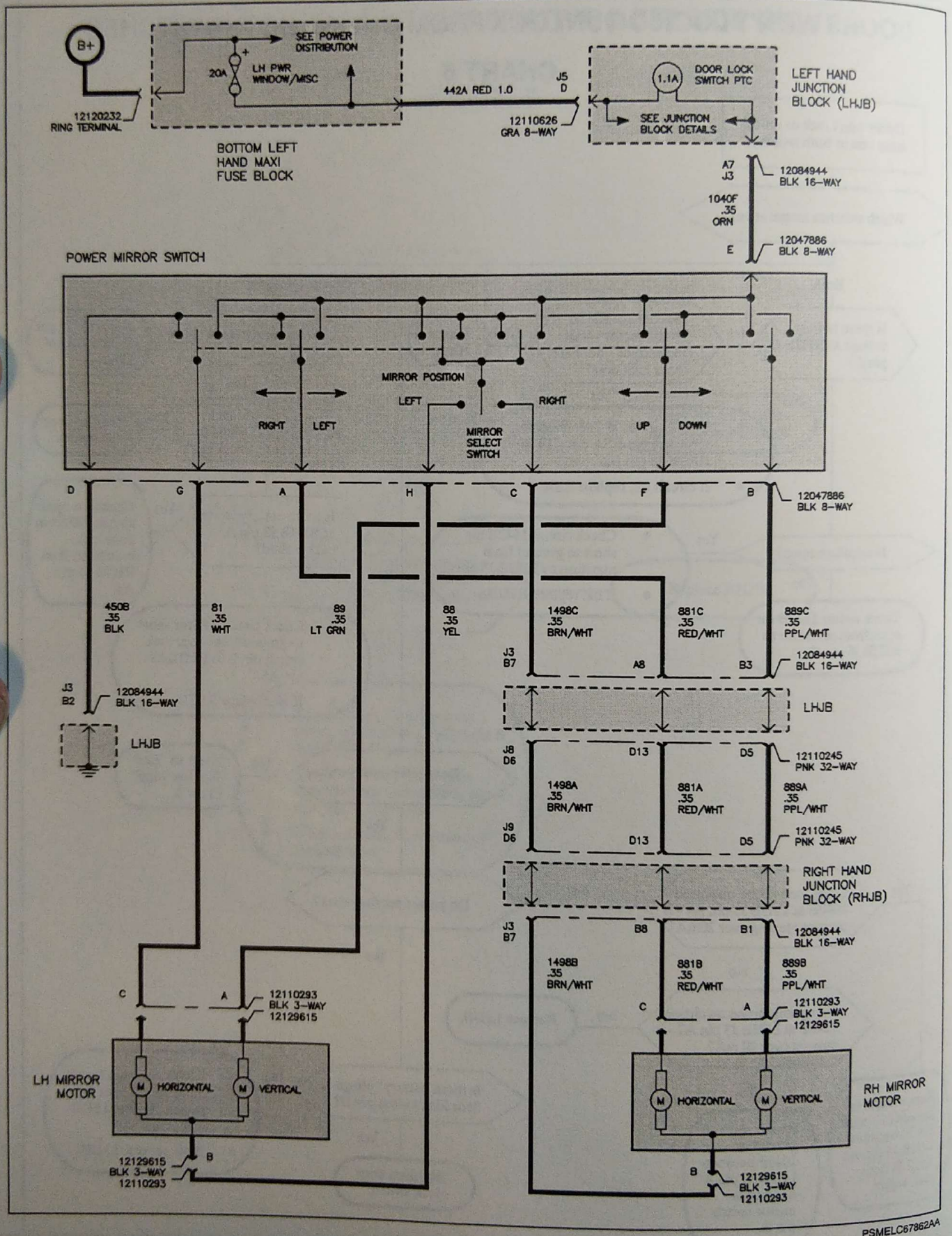
DOORS WON'T LOCK OR UNLOCK FROM ONE OR BOTH SWITCHES

CHART 6



POWER MIRRORS



POWER MIRRORS COMPONENT LOCATION VIEW

POWER MIRRORS

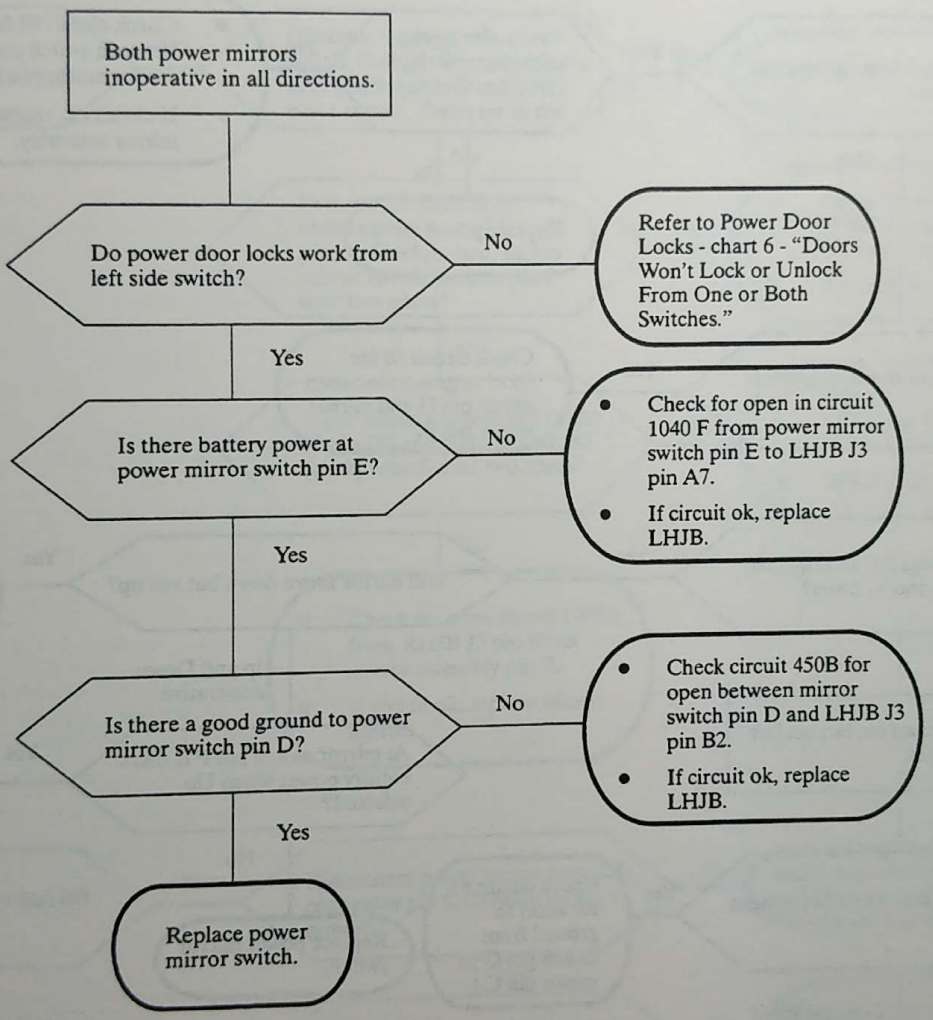
The power mirror motors all receive their power and ground through the power mirror switch. The power to the power mirror switch is provided by a 1.1 amp positive temperature coefficient (PTC) in the left hand junction block (LHJB). A dedicated ground to the switch is provided by the LHJB.

POWER MIRRORS TROUBLE TREE INDEX

- Chart 1 – Both Power Mirrors Inoperative In All Directions
- Chart 2 – Left Side Power Mirror Problem
- Chart 3 – Right Side Power Mirror Problem

BOTH POWER MIRRORS INOPERATIVE IN ALL DIRECTIONS

CHART 1



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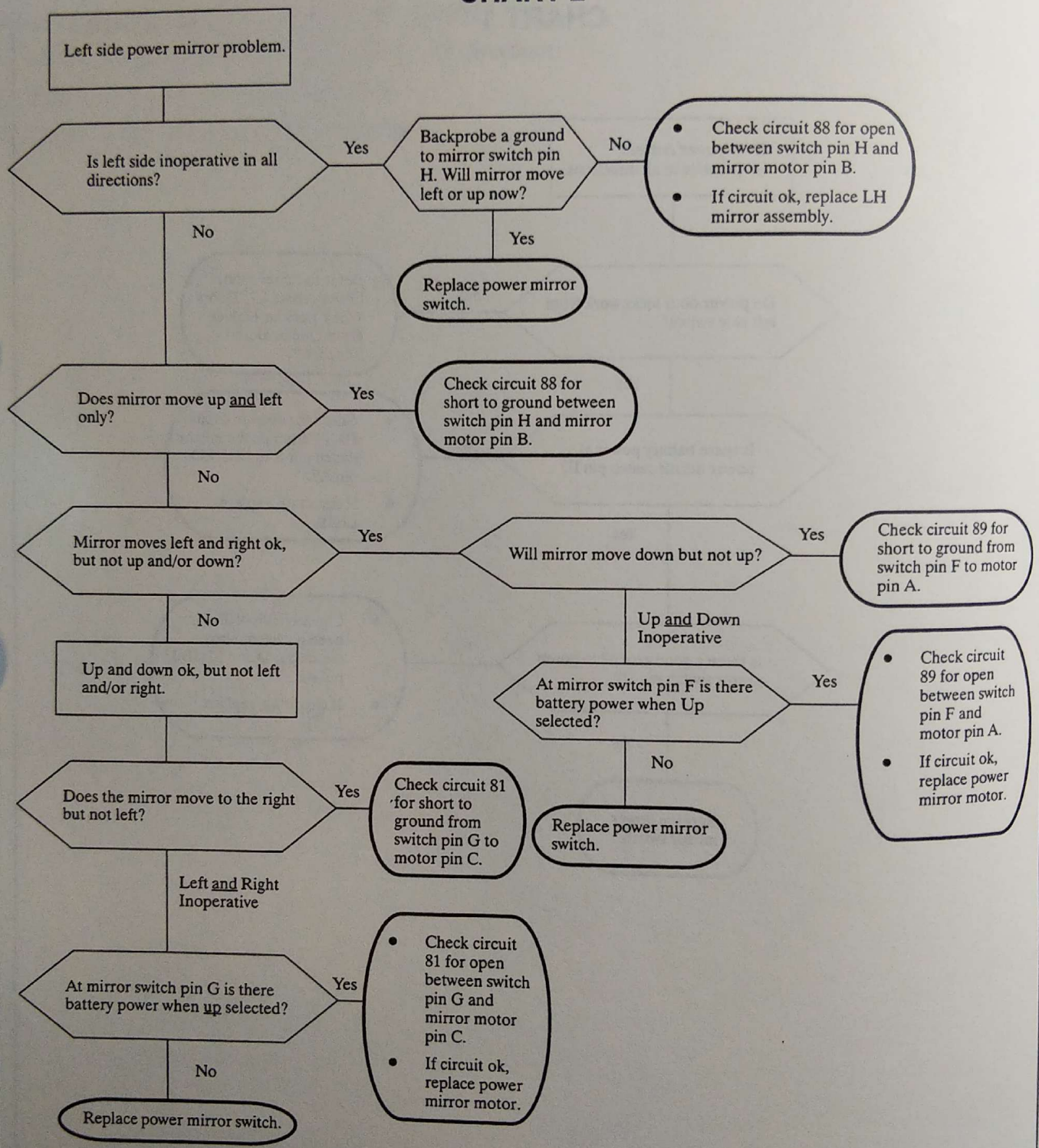
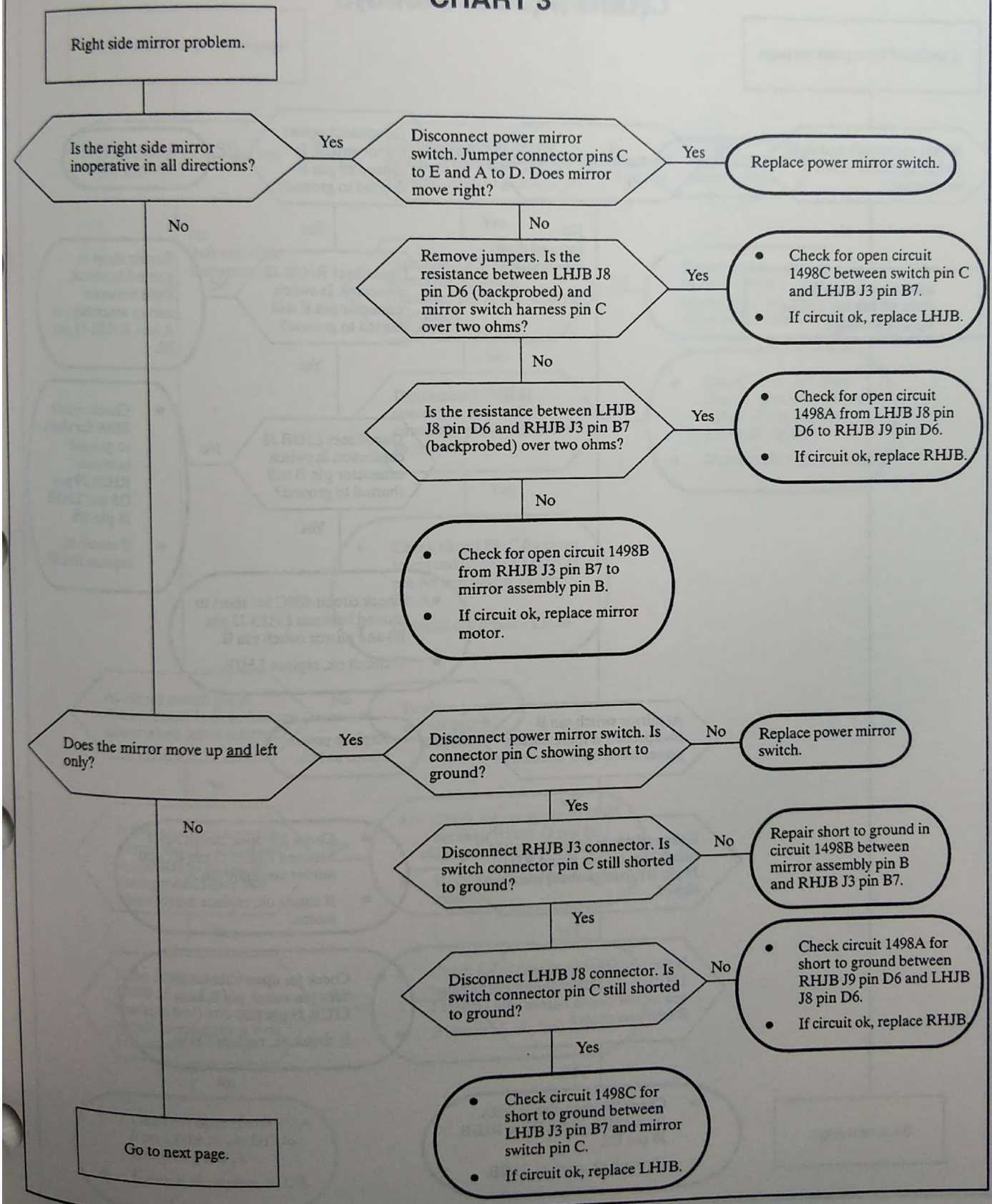
LEFT SIDE POWER MIRROR PROBLEM

CHART 2



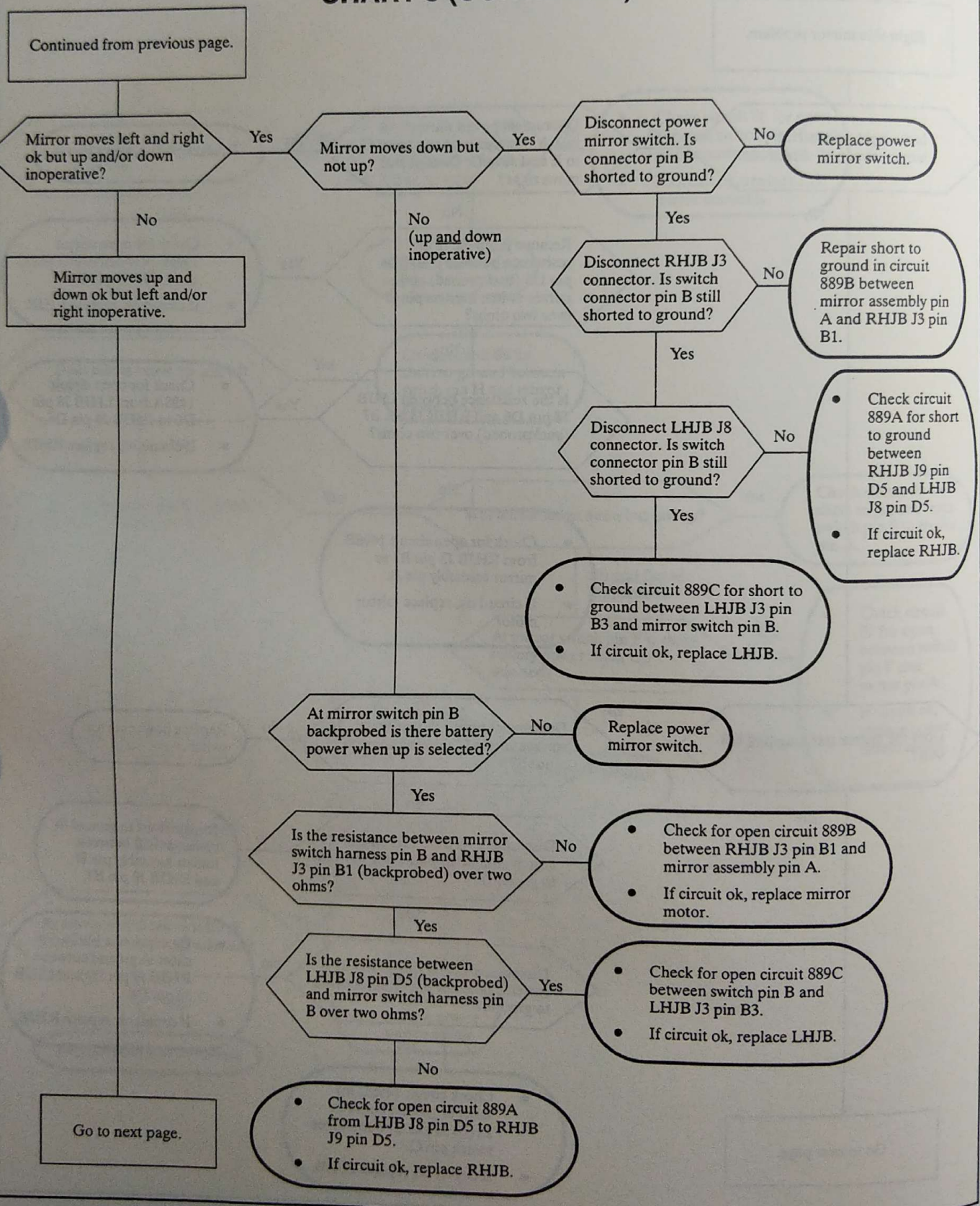
RIGHT SIDE POWER MIRROR PROBLEM

CHART 3



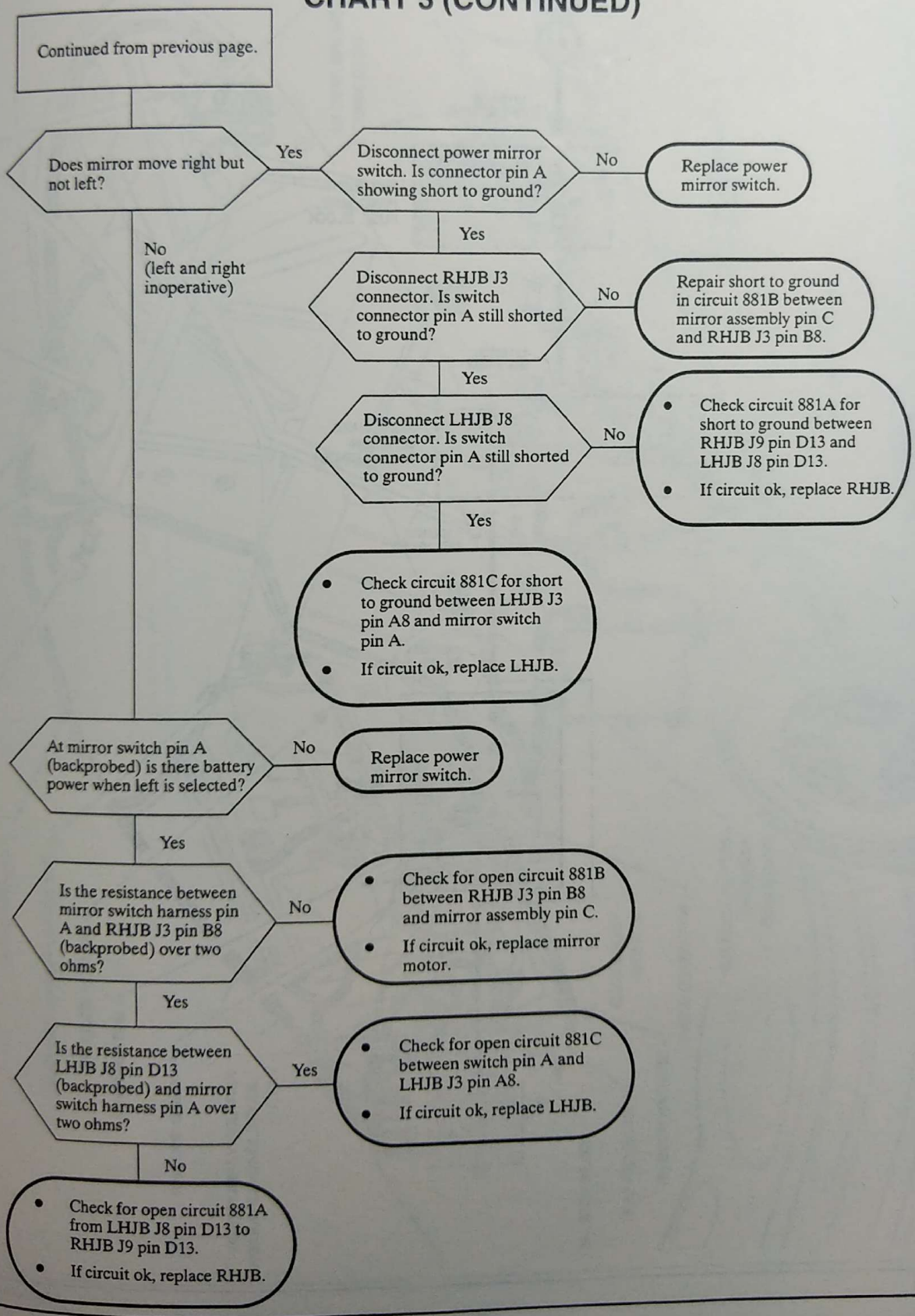
RIGHT SIDE POWER MIRROR PROBLEM

CHART 3 (CONTINUED)



RIGHT SIDE POWER MIRROR PROBLEM

CHART 3 (CONTINUED)



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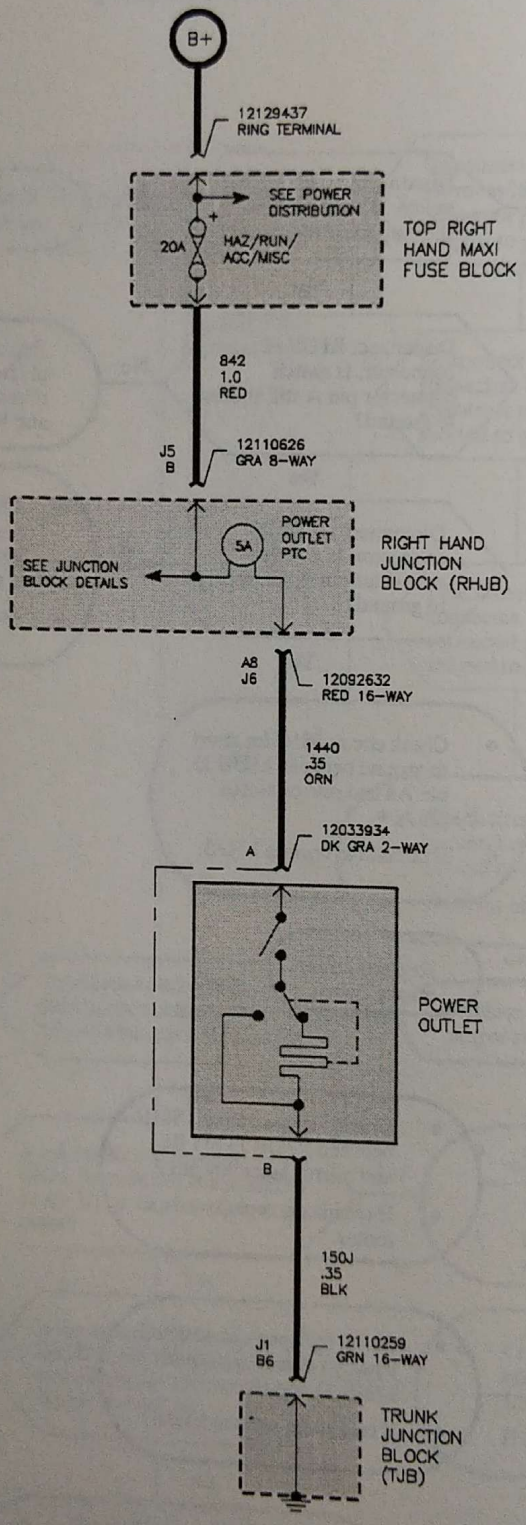
POWER OUTLET



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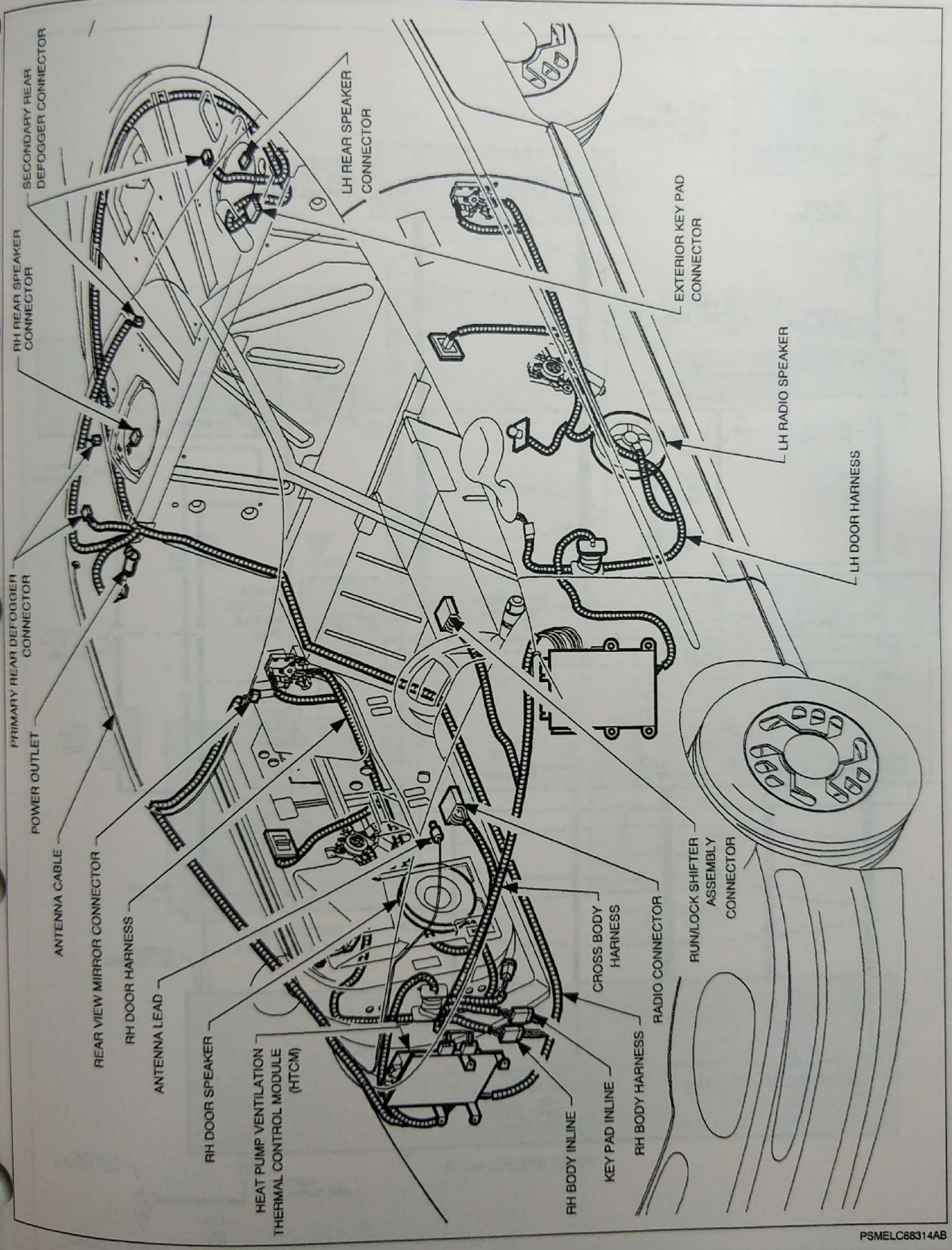
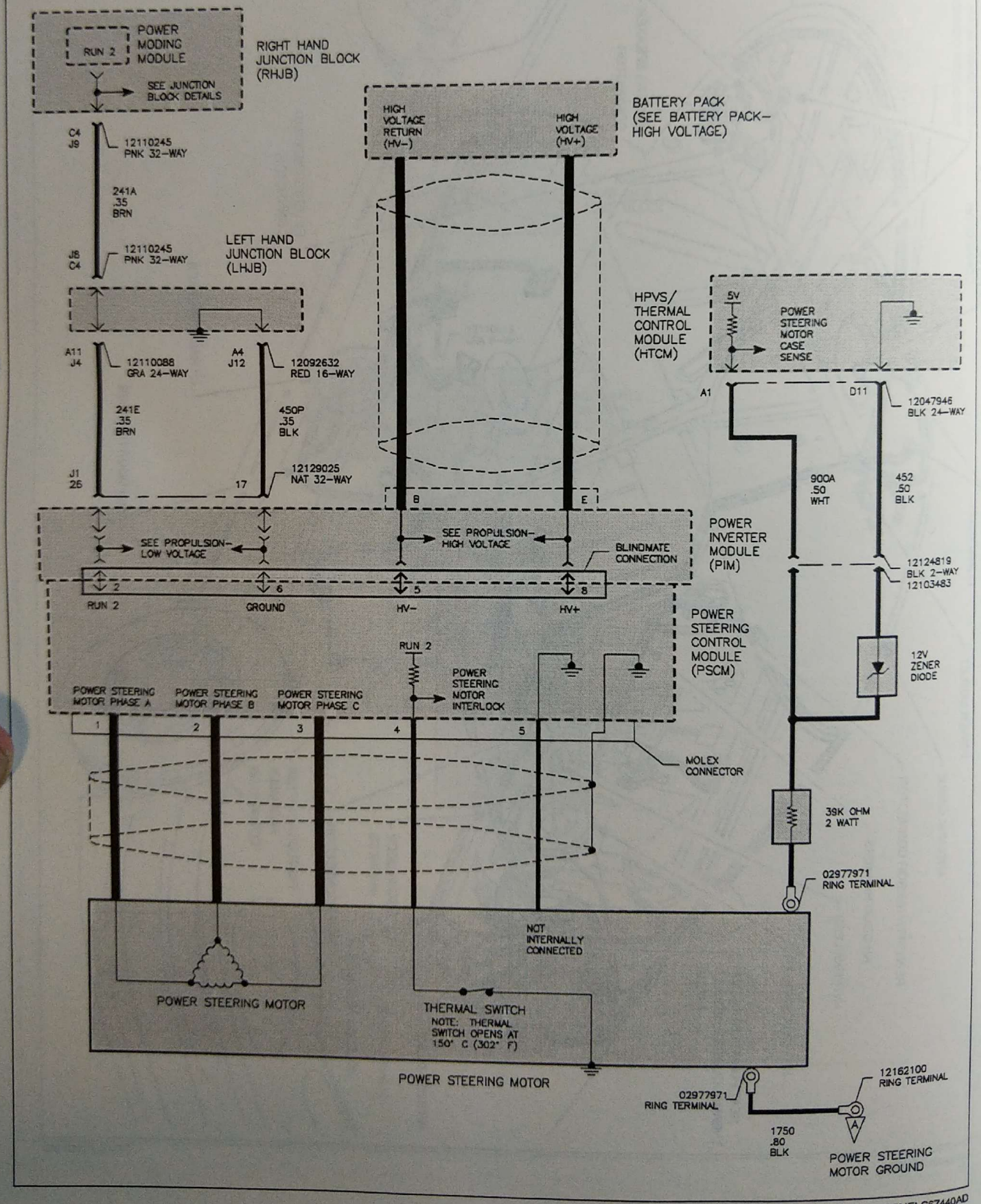
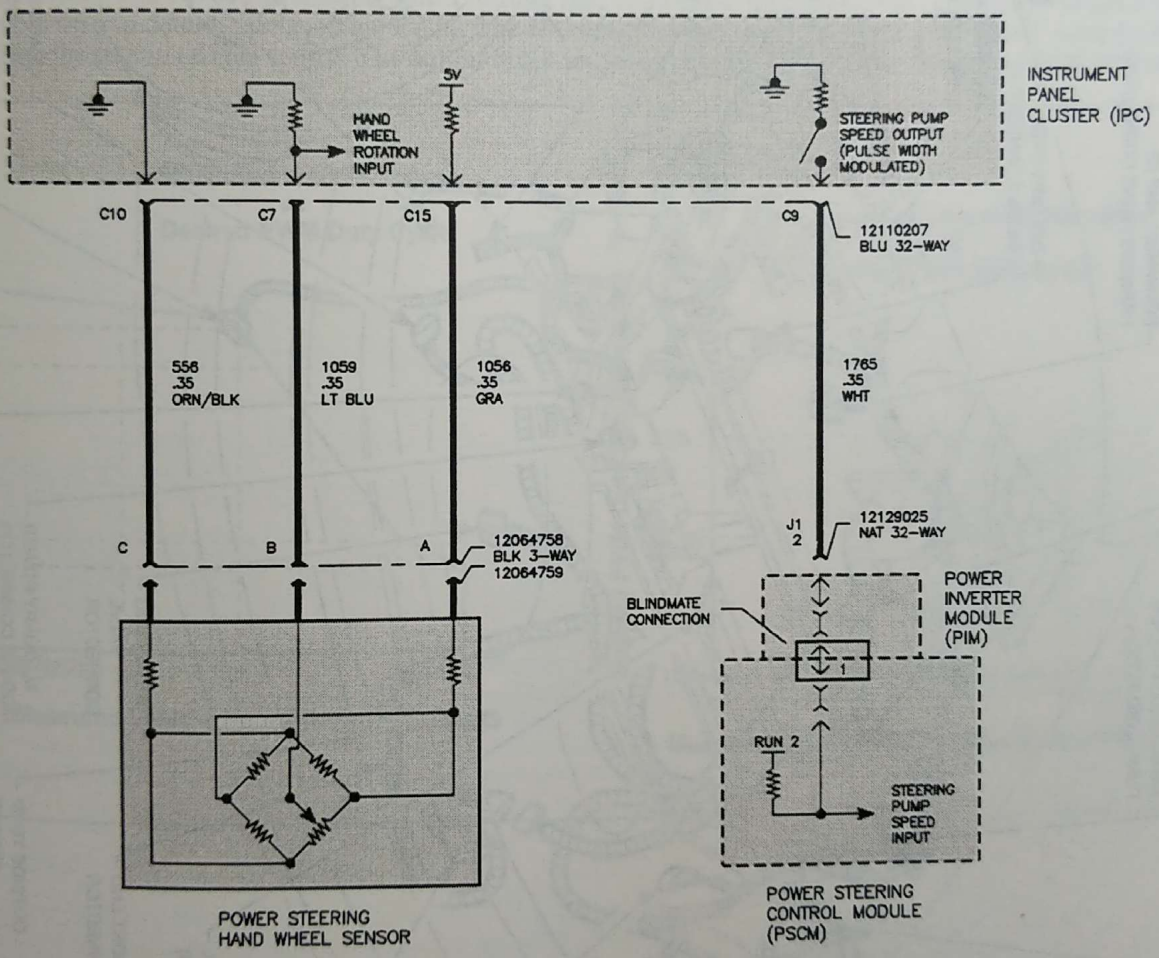
POWER OUTLET COMPONENT LOCATION VIEW



POWER STEERING CONTROL MODULE





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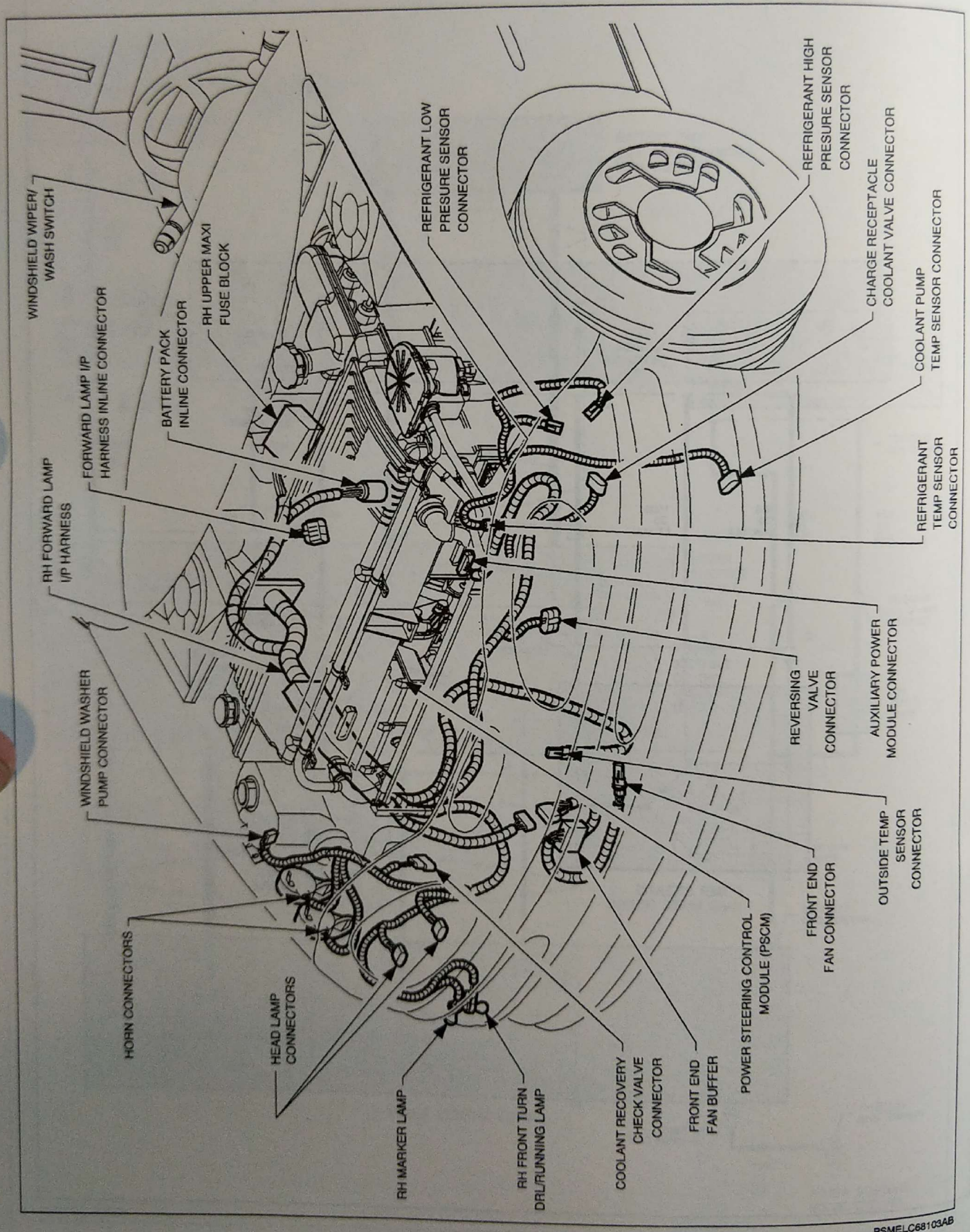
POWER STEERING CONTROL MODULE COMPONENT LOCATION VIEW

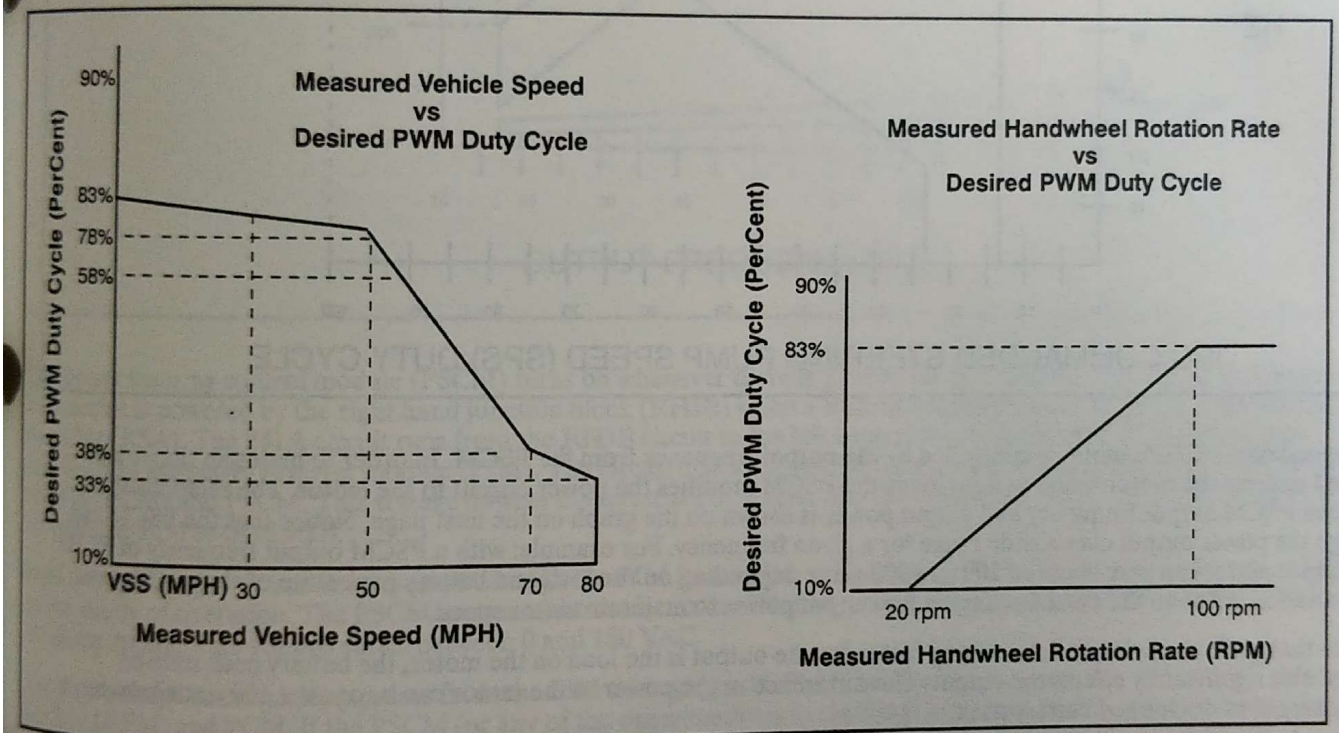


POWER STEERING CONTROL MODULE

The purpose of the power steering control module (PSCM) is to control the power steering pump (electro-hydraulic power steering [EHPS] motor). The PSCM controls the speed of the EHPS motor, which determines power steering assist. Power steering assist is controlled to meet driving requirements. The amount of power steering assist is determined by the instrument panel cluster (IPC) based on vehicle speed and steering wheel rotation speed.

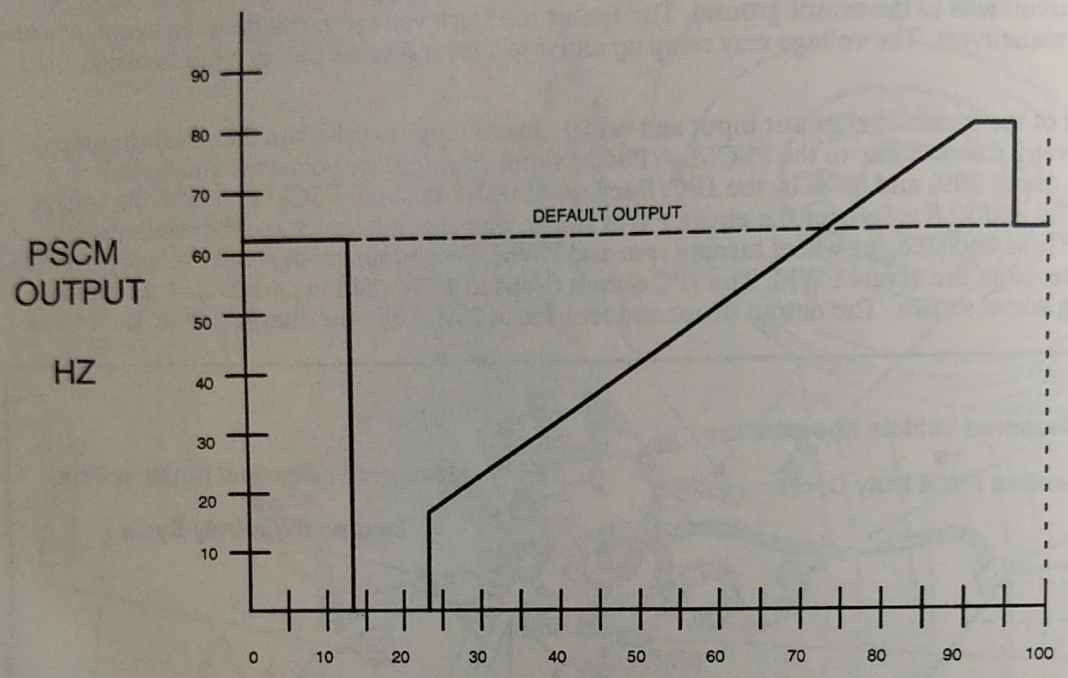
The IPC monitors the handwheel sensor feedback voltage whenever in Run mode. A five volt reference is fed to the sensor and a sensor return circuit acts as the sensor ground. The sensor feedback voltage varies between about 0.5v and 4.6v during normal steering maneuvers. The voltage may ramp up and down several times during a full steering maneuver.

The IPC uses a combination of the handwheel sensor input and vehicle speed input to calculate the steering pump speed signal, which is sent over a discreet line to the PSCM. A PSCM supplied reference voltage is pulse width modulated (PWM) between about 20% and 83 % by the IPC. Because of resistors in the PSCM and IPC, the voltage only varies between about 11.0 and 12.8 volts over the entire PWM range. The charts below show the relationships between vehicle speed and PWM and steering wheel turning rpm and PWM. Whichever input results in a larger PWM at a given time is used to determine the actual PWM. The IPC output drops to 48% when in park after 4 seconds of nonactivity from the steering wheel sensor. The output drops and remains at 20% while the charge paddle is inserted



The IPC duty cycle signal to the PSCM is shown in the graph below.

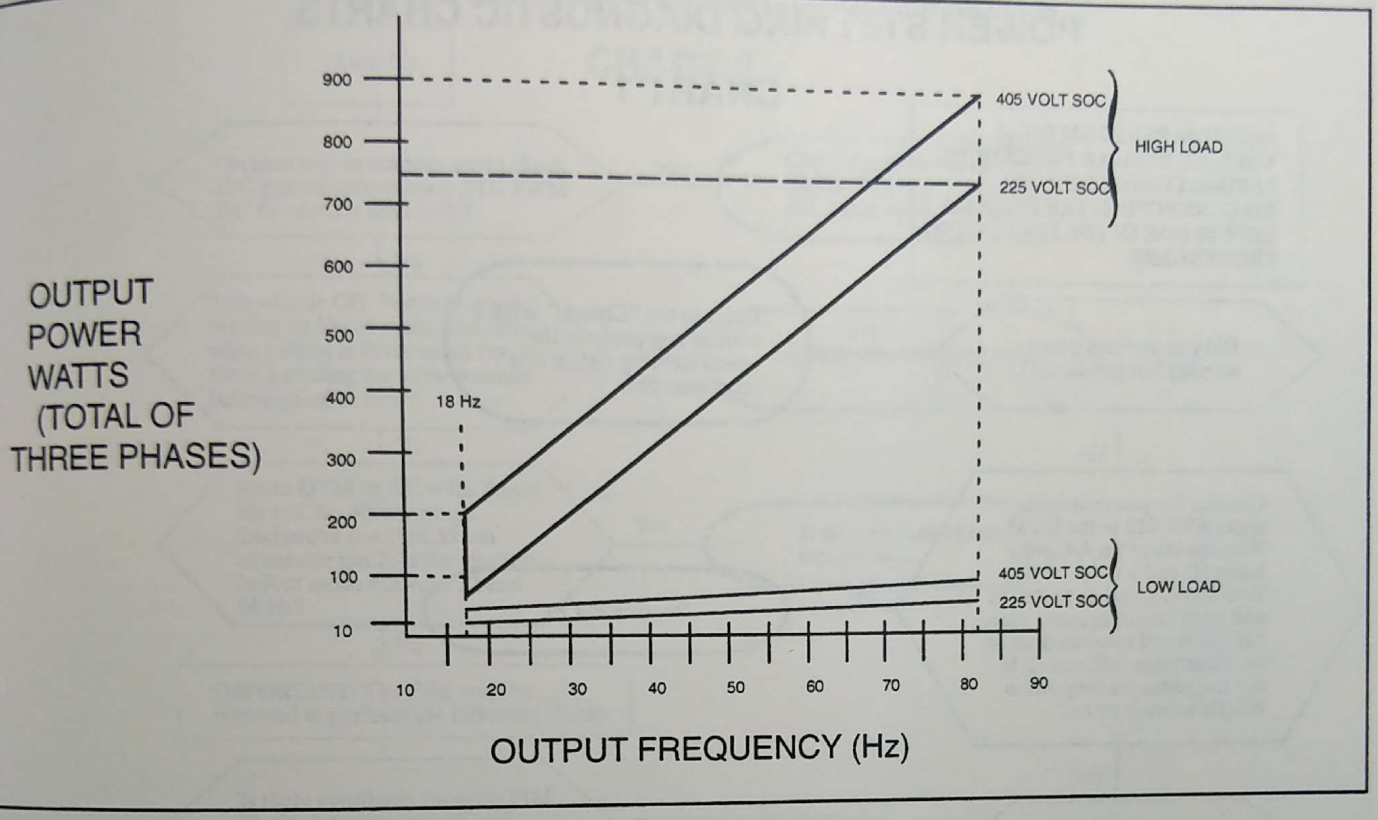
If the signal from the IPC is out of range < 5% or > 87% the PSCM defaults to 62 Hz output. The PSCM turns the motor Off when the IPC sends a 77% to 87% duty cycle signal.



IPC COMMANDED STEERING PUMP SPEED (SPS) DUTY CYCLE

The speed of the EHPS motor is controlled by the output frequency from the PSCM. In order to maintain the power needed to drive the motor under various loads the PSCM modifies the power output to the motor. The relationship between PSCM output frequency and output power is shown on the graph on the next page. Notice that the PSCM can change the power output over a wide range for a given frequency. For example: with a PSCM output frequency of 82 Hz the output power can vary between 100 and 900 watts depending on the load and battery pack state of charge. Most of this variation is due to the PSCM changing the output power to maintain motor speed.

Notice that while the primary determining factor for the output is the load on the motor, the battery pack state of charge also significantly affects the output. The difference in the power to the motor can be as over 100 watts between a fully charged vs discharged battery pack.



The power steering control module (PSCM) turns on whenever there is 12 volts on the secondary run power circuit 241. This circuit is powered by the right hand junction block (RHJB) when a Run command is issued by the run/lock shifter assembly (RSA). The 241A circuit runs from the RHJB circuit to the left hand junction block (LHJB) and then turns into 241E to the power inverter module (PIM). The circuit divides in the PIM and feeds both the propulsion control module (PCM) and PSCM. This voltage powers the internal PSCM circuitry. The 12 volt ground for the PSCM runs through the PIM to the LHJB.

High voltage DC power and return come through the PIM from either the battery pack or charge receptacle, depending on the mode of operation. The PSCM inverts and transforms the DC high voltage into three phase AC voltage to drive the pump motor. This voltage varies between 0 and 180 VAC.

The high voltage interlock loop passes from the PIM through the PSCM in addition to the accessory AC and DC power module (APM) and PCM. If the PSCM (or any of the other modules in the loop) are disconnected or have an open in this circuit, high voltage is shut off and DTCs are set. Diagnosis of an open interlock loop should be performed by following the trouble trees for the DTCs set.

There is another interlock loop that affects only the PSCM operation. It consists of wiring to and from the EHPS motor and a thermal switch in the EHPS motor. The switch opens if the motor overheats (150°C [302°F]). If the loop opens the PSCM will stop three phase power to the motor until loop continuity is restored and the vehicle (Run 2 voltage) is cycled Off and back On.

The PSCM watches the power output to the EHPS motor. If it determines there is an over current, over temperature, or other fault condition, power to the EHPS motor will be shut off until Run 2 power is cycled Off and back On again.

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POWER STEERING DIAGNOSTIC CHARTS

CHART 1

CAUTION: PERFORM HIGH VOLTAGE DISABLE PROCEDURE BEFORE CONNECTING OR DISCONNECTING THE PSCM OR TESTER BOX IN THE FOLLOWING PROCEDURES.

Did you perform power steering test procedure?

No → Refer to the "Chassis" service manual and perform the power steering system test procedure first.

Yes

Connect the power steering tester EV97012 to the DVM. With the DVM on A/C volts, select Hz and a range of 40. With tool hooked up to PSCM and power steering pump enter run mode and take readings on switch settings A,B, and C. Is the frequency reading within two Hz on each phase?

No → Replace PSCM.

Yes

What are the frequency readings?

- 0 Hz → Go to Chart 2
- 1–37, 47–59, or 66–83 Hz → Go to Chart 3
- 60–65 Hz → Go to Chart 4
- 38–46 Hz (Normal Reading)

Turn the steering wheel while watching the reading - does the frequency jump to between 76 and 80 Hz for four seconds, then return to 38–46 Hz?

No → Select IPC general info on PDT scanner mode. Does HWS INPUT fluxuate between about 0.5 and 4.6 while turning the steering wheel?

No → Replace handwheel sensor (part of steering wheel assembly).

Yes → Replace IPC.

Yes

Drive vehicle - do the frequencies match the chart for speed vs Duty cycle under power steering control module? (on scan tool in scanner mode in IPC general information)

No → Does the IPC display the correct speed while driving?

No → Refer to IPC chart 3 VSS erratic/flashing/zero all the time.

Yes → Replace IPC.

Yes

Perform power steering system hydraulic test.

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POWER STEERING DIAGNOSTIC CHARTS

CHART 2

Zero Hz

On scan tool in scanner mode check IPC general information STR PWM DC % - does it read 20%?

Yes → Check for presence of charge paddle. If inserted, remove it and begin chart 1 again.

No

Turn vehicle Off. Watch frequency reading on DVM again, this time when vehicle is first turned On. Is there a reading for a few seconds before going to zero?

Yes → Replace power steering pump.

No

Set to DVM to AC volts. Select Hz and the 400mv range. Backprobe the PIM 32 pin connector pin 2. Is the reading in Run mode between 72 and 76 Hz?

Yes → If no codes are present replace IPC.

No

IMPORTANT: The PIM must be removed to perform the following checks.

Is there continuity between PIM 32 pin connector pin 26 and PSCM/PIM connector pin 2?

Yes

Is there continuity between PIM 32 pin connector pin 17 and PSCM/PIM connector pin 6?

Yes

Is there continuity between PIM 32 pin connector pin 2 and PSCM/PIM connector pin 1?

No → Replace PIM.

Yes

Is there continuity between PIM battery pack canon connector pin B and PSCM/PIM connector pin 5?

Yes

Is there continuity between PIM battery pack canon connector pin E and PSCM/PIM connector pin 8?

Yes

- Replace PSCM.
- If condition is still present replace power steering pump for seized condition.

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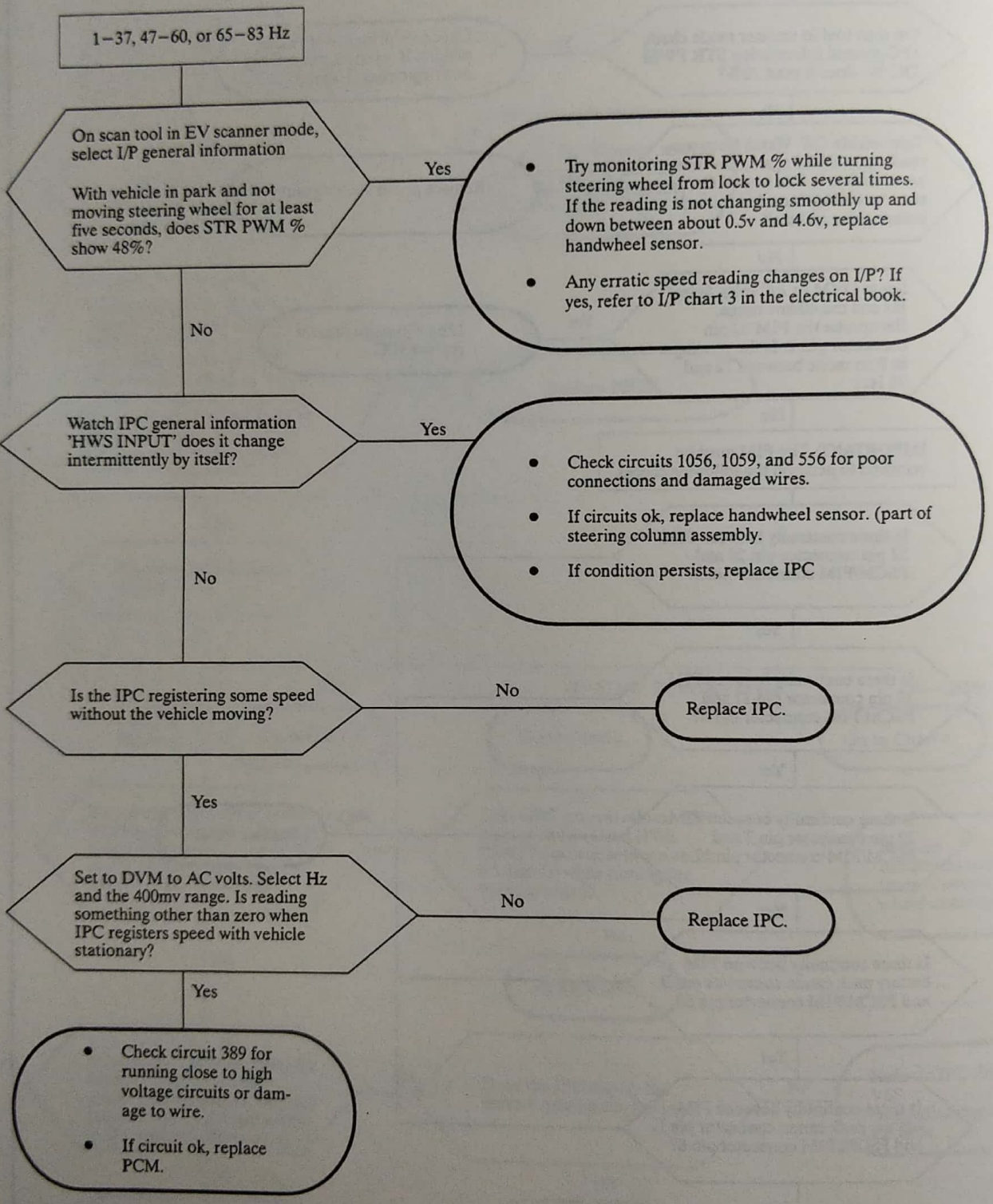
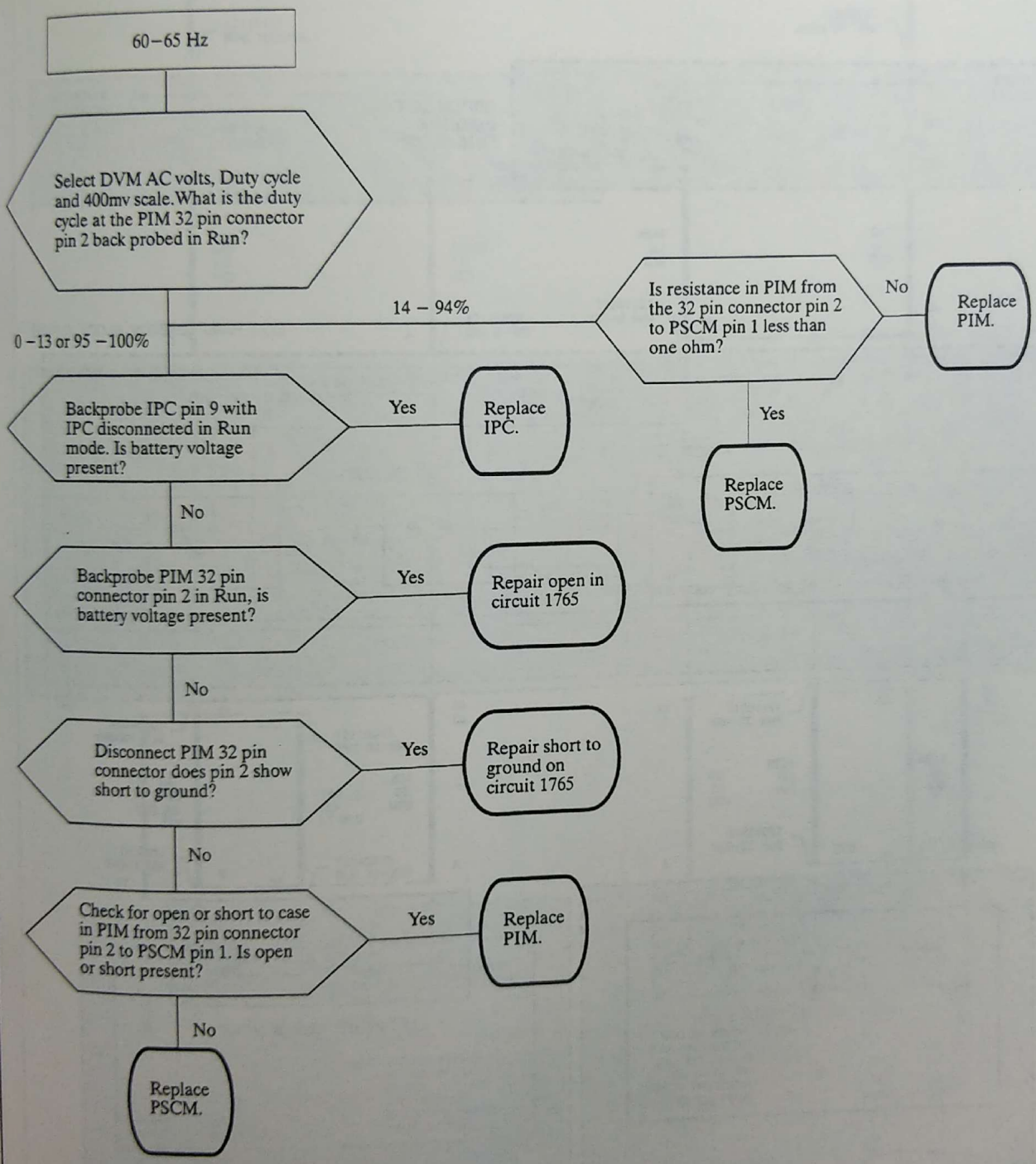
POWER STEERING DIAGNOSTIC CHARTS

CHART 3

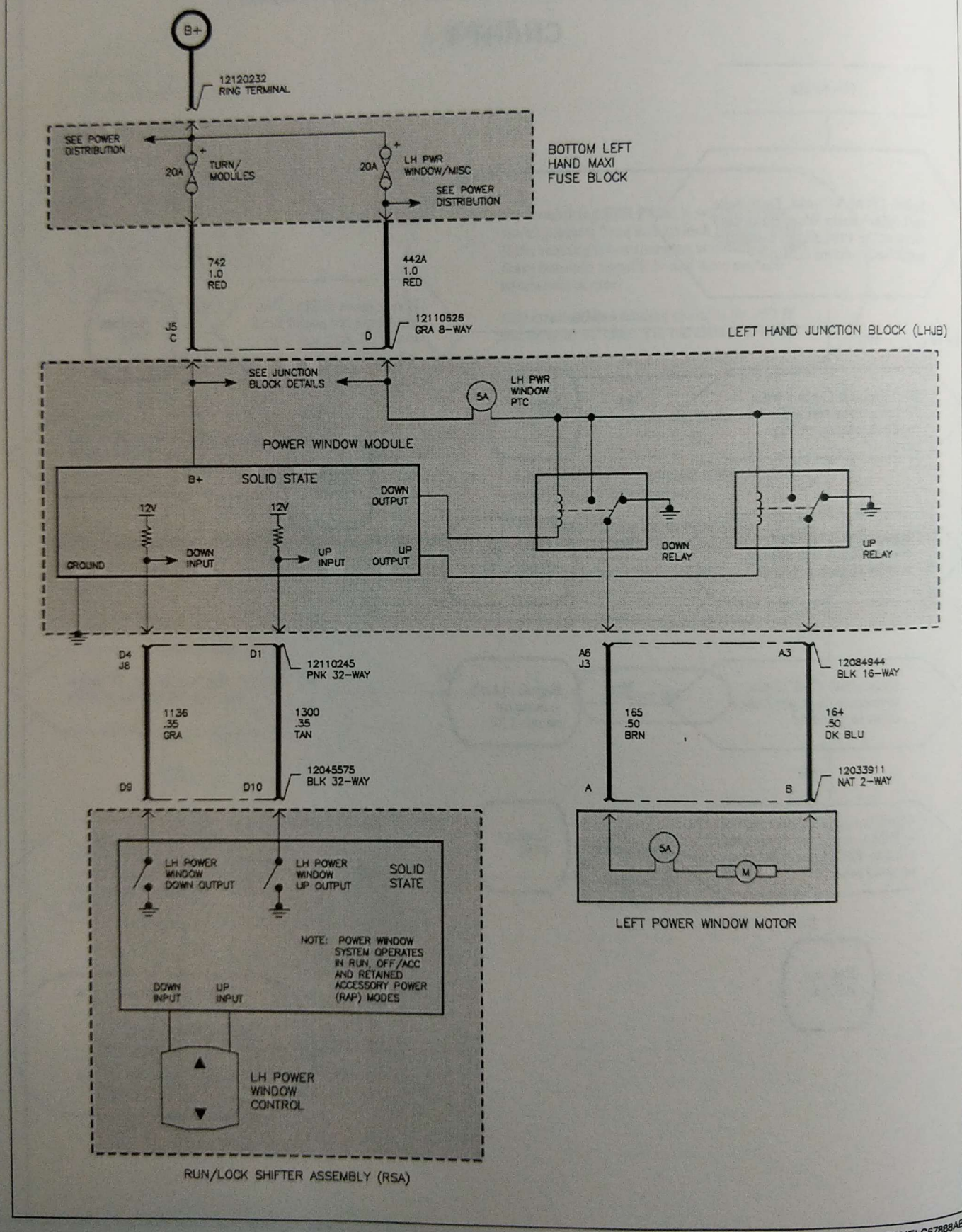


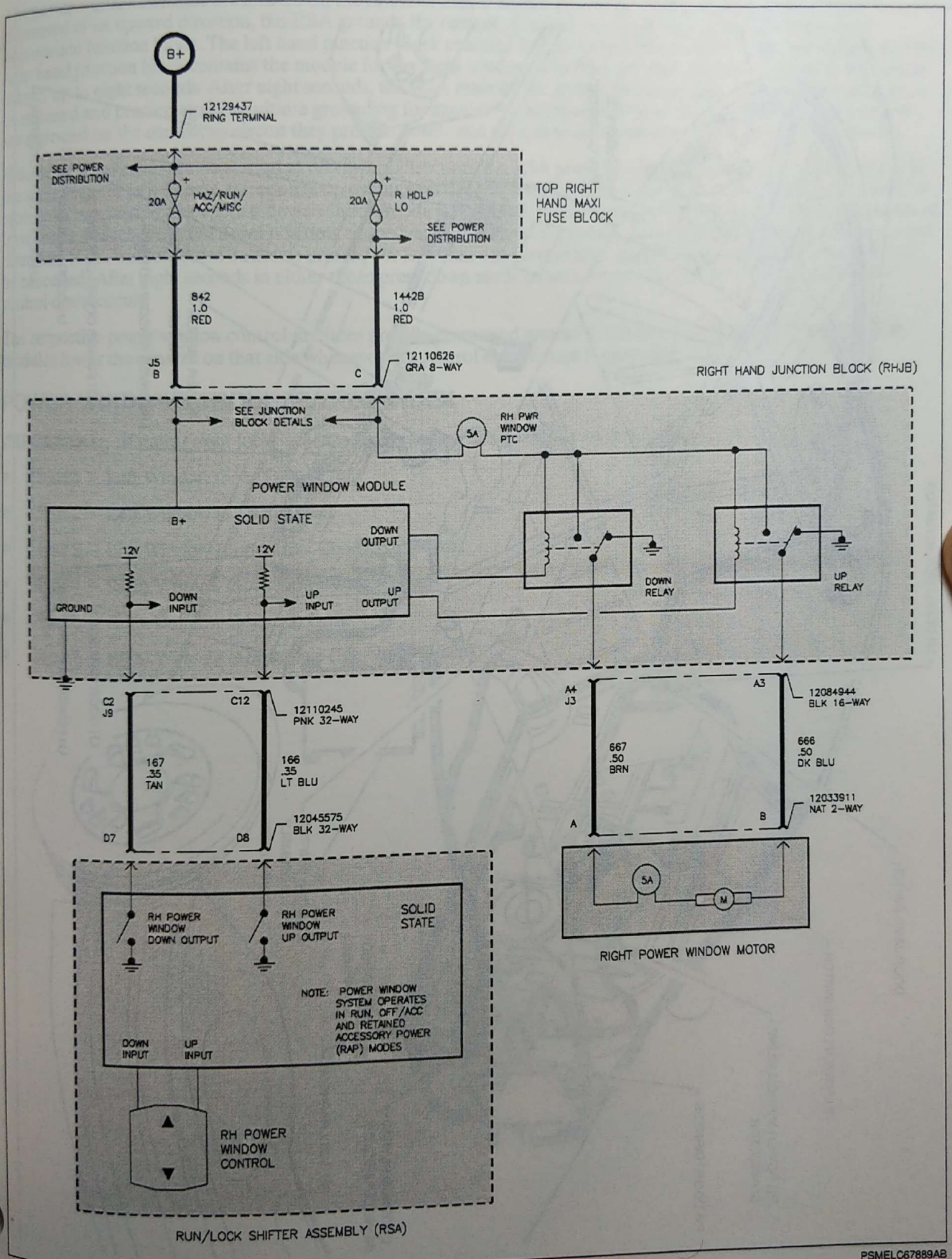
POWER STEERING DIAGNOSTIC CHARTS

CHART 4

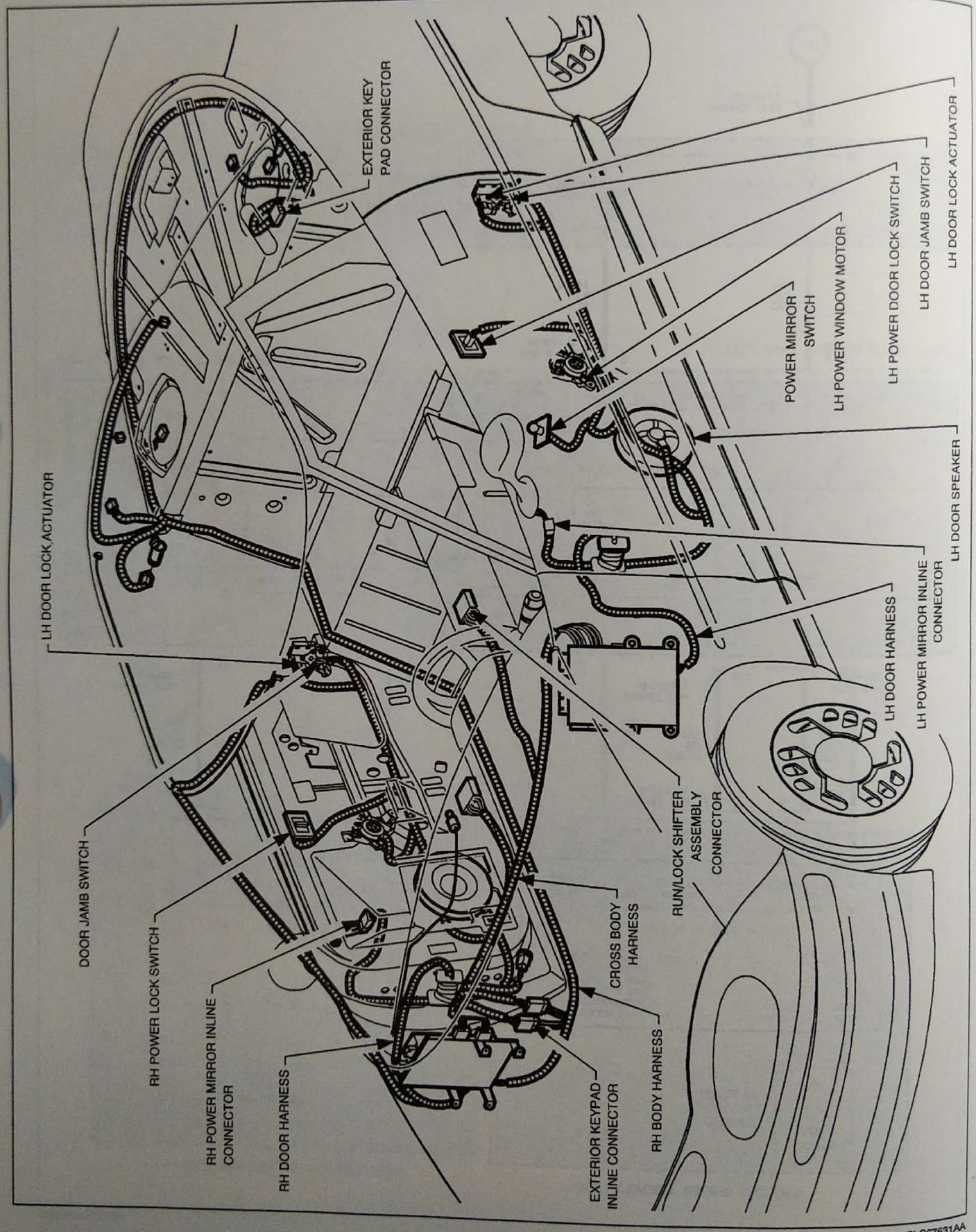


POWER WINDOWS




B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION
20A
HAZ/RUN/ ACC/MISC
20A
R HDLP LO
SEE POWER DISTRIBUTION
TOP RIGHT HAND MAXI FUSE BLOCK
842
1.0
RED
1442B
1.0
RED
J5
B
C
12110626
GRA 8-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
SEE JUNCTION BLOCK DETAILS
5A
RH PWR WINDOW PTC
POWER WINDOW MODULE
B+
SOLID STATE
DOWN OUTPUT
12V
12V
GROUND
DOWN INPUT
UP INPUT
UP OUTPUT
DOWN RELAY
UP RELAY
C2
J9
C12
12110245
PNK 32-WAY
167
.35
TAN
166
.35
LT BLU
D7
D8
12045575
BLK 32-WAY
A4
J3
A3
12084944
BLK 16-WAY
667
.50
BRN
666
.50
DK BLU
A
B
12033911
NAT 2-WAY
5A
M
RIGHT POWER WINDOW MOTOR
RH POWER WINDOW DOWN OUTPUT
RH POWER WINDOW UP OUTPUT
SOLID STATE
NOTE: POWER WINDOW SYSTEM OPERATES IN RUN, OFF/ACC AND RETAINED ACCESSORY POWER (RAP) MODES
DOWN INPUT
UP INPUT
RH POWER WINDOW CONTROL
RUN/LOCK SHIFTER ASSEMBLY (RSA)
PSMELC67889AB

POWER WINDOWS COMPONENT LOCATION VIEW



POWER WINDOWS

The power window switches are located on the run/lock shifter assembly (RSA). When a power window button is depressed in an upward direction, the RSA grounds the control up circuit to the power window module in the appropriate junction block. The left hand junction block contains the power window module for the left window and the right hand junction block contains the module for the right window. The RSA grounds the circuit as long as the button is held, up to eight seconds. After eight seconds, the RSA releases the ground to the module. The window button must be released and pressed again to initiate grounding for another eight seconds. Whenever the power window modules see a ground on the control up circuit they provide power and ground to the window motor to move the window up.

If the window switches are depressed in downward direction, the RSA provides a ground to the control down circuit in the same manner as it does to the control up circuit with the following exception. If the window down button is held for more than one second, the express down window mode is activated. In this mode the window will continue its downward travel until it reaches the full down position, or the window switch is depressed again in either the upward or downward direction. If the window down button is pressed for less than one second after express down has been activated, it will be cancelled. After eight seconds in either the express down mode or with the switch held, the RSA ungrounds the control down circuit.

The respective power window control modules provide power and ground to the window motor that it controls. The modules lower the window on that side whenever the control down circuit is grounded.

POWER WINDOWS TROUBLE TREE INDEX

IMPORTANT: If power door locks are also inoperative, refer to "Power Door Lock Diagnosis" first.

- Chart 1 – Left Window Goes Down Only
- Chart 2 – Left Window Goes Up Only
- Chart 3 – Left Window Inoperative (No Up or Down)
- Chart 4 – Right Window Goes Down Only
- Chart 5 – Right Window Goes Up Only
- Chart 6 – Right Window Inoperative (No Up or Down)

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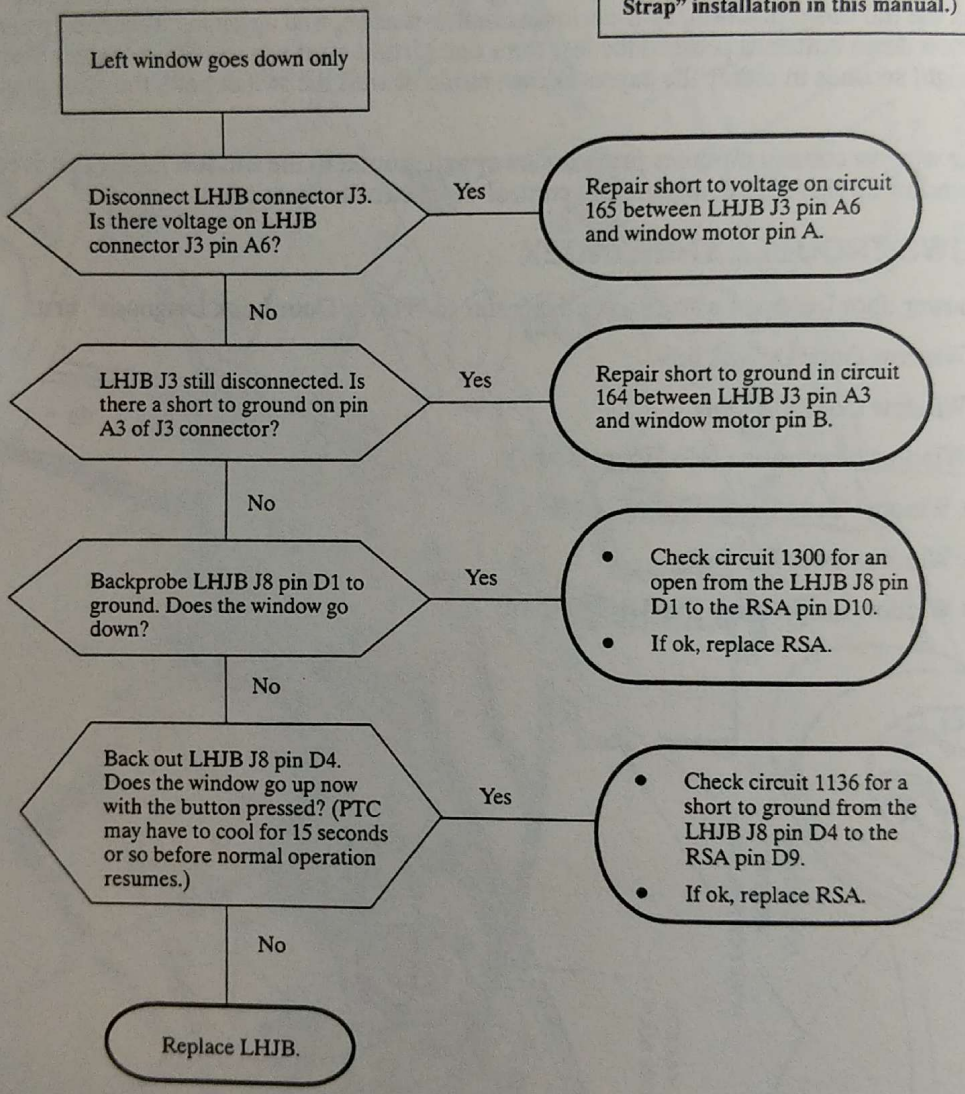
LEFT WINDOW GOES DOWN ONLY

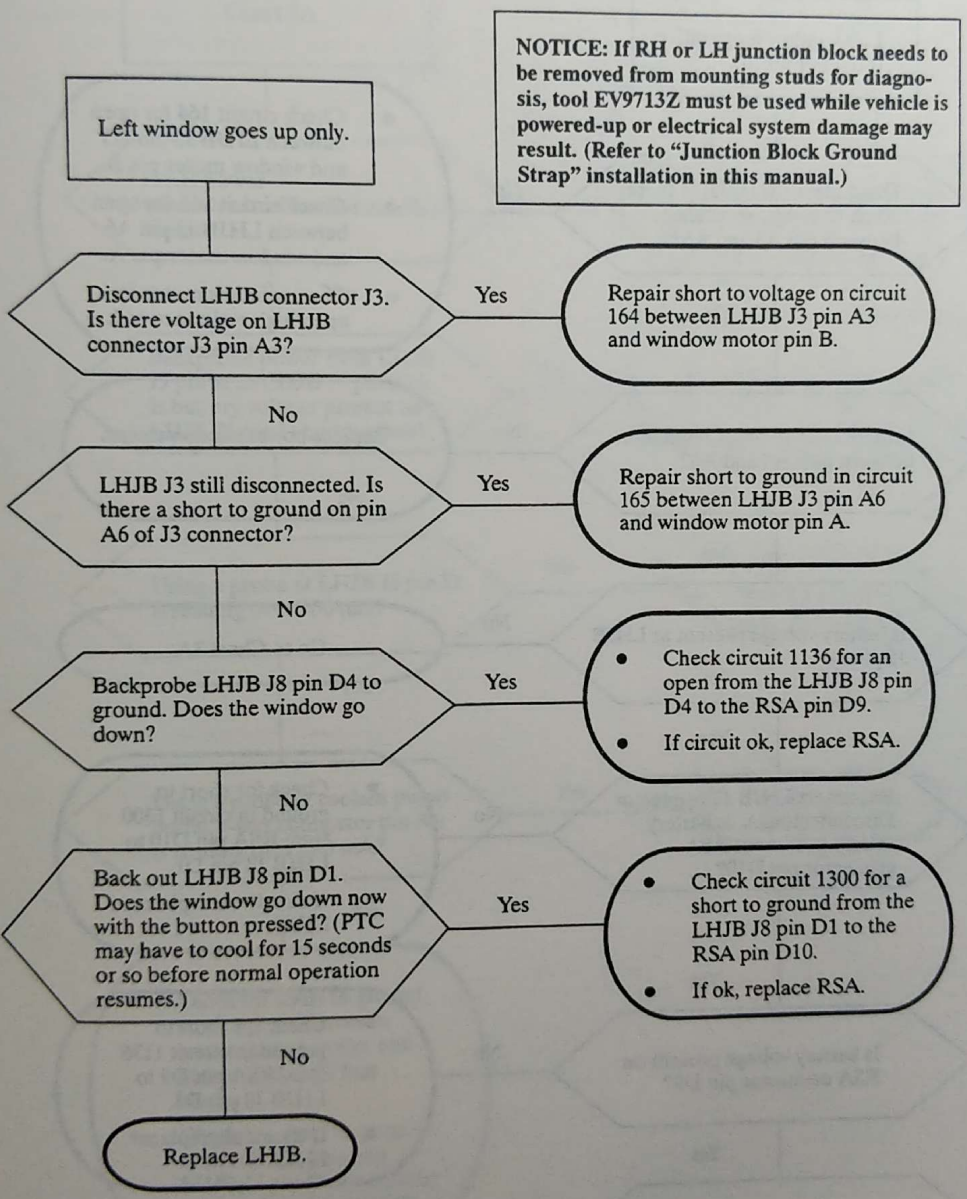
CHART 1

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



LEFT WINDOW GOES UP ONLY

CHART 2



CamScanner

LEFT WINDOW INOPERATIVE (NO UP OR DOWN)

CHART 3

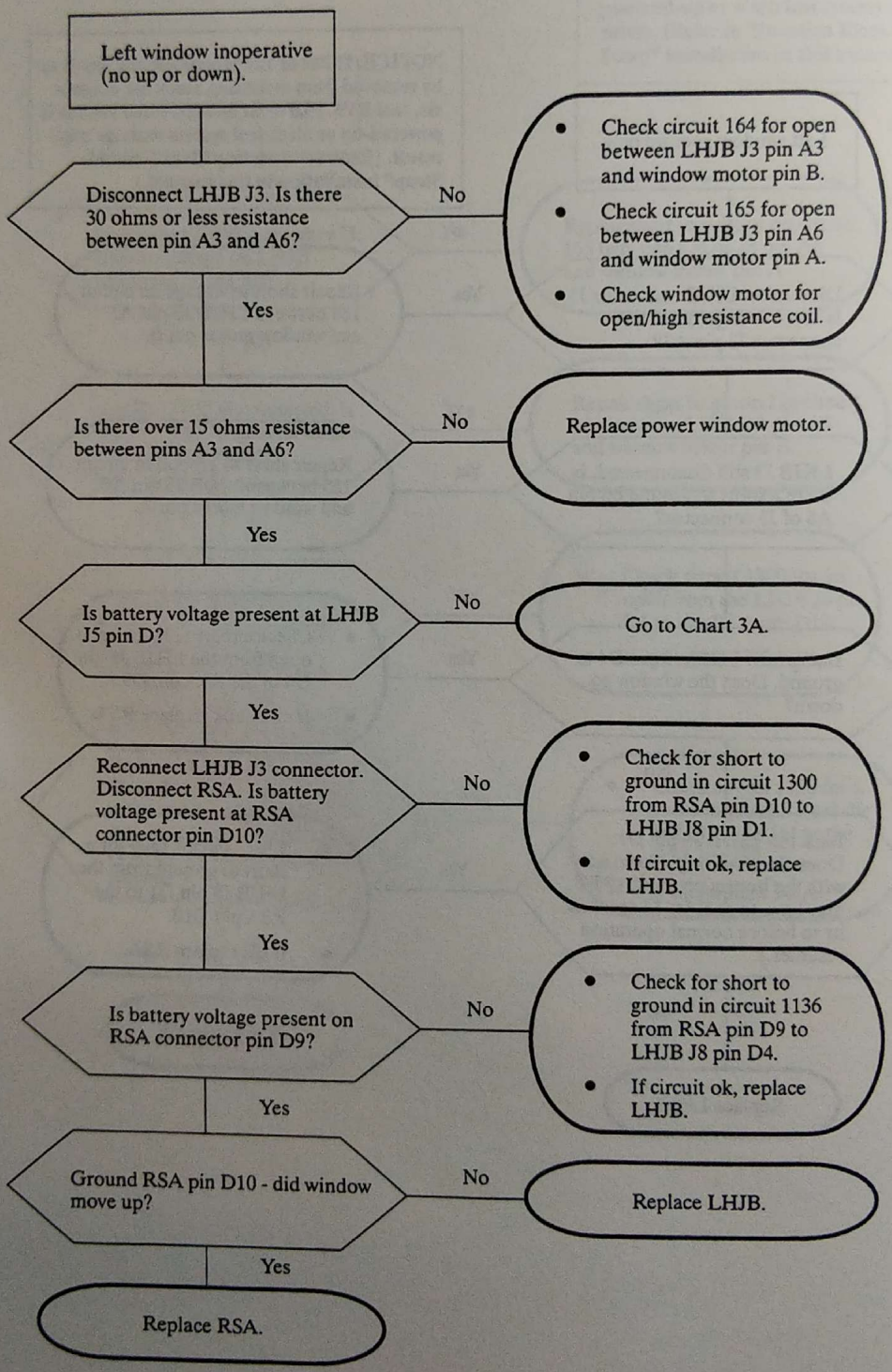
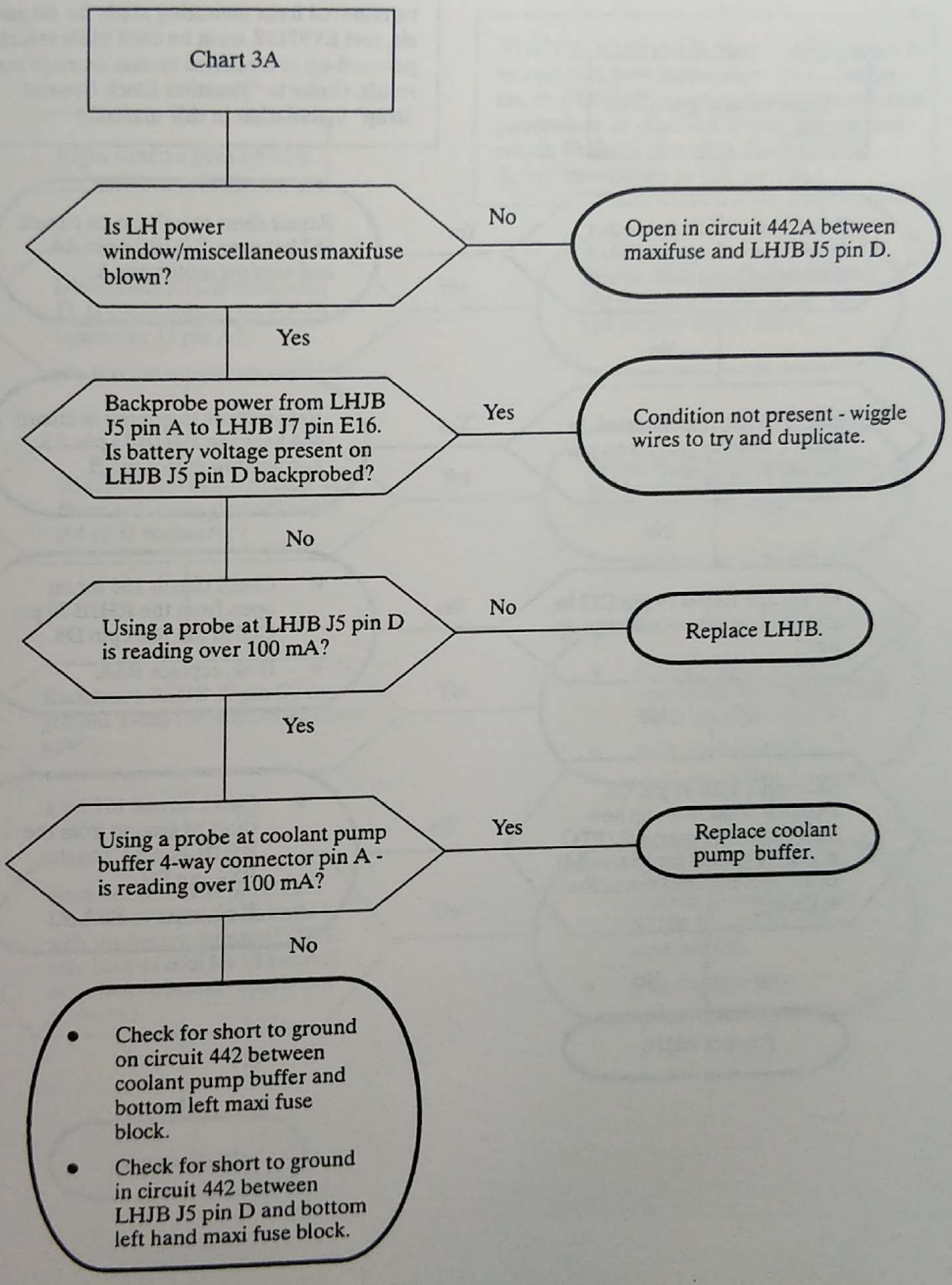


CHART 3A

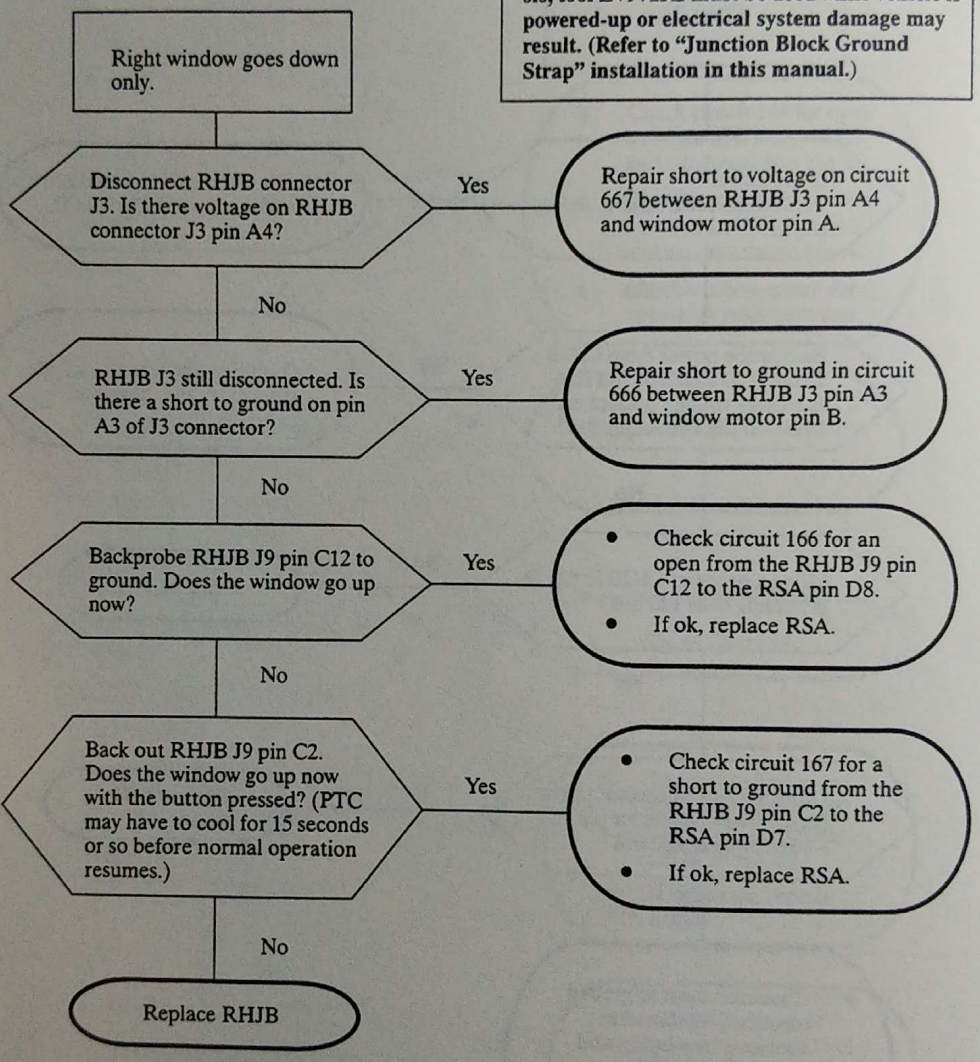


CamScanner

RIGHT WINDOW GOES DOWN ONLY

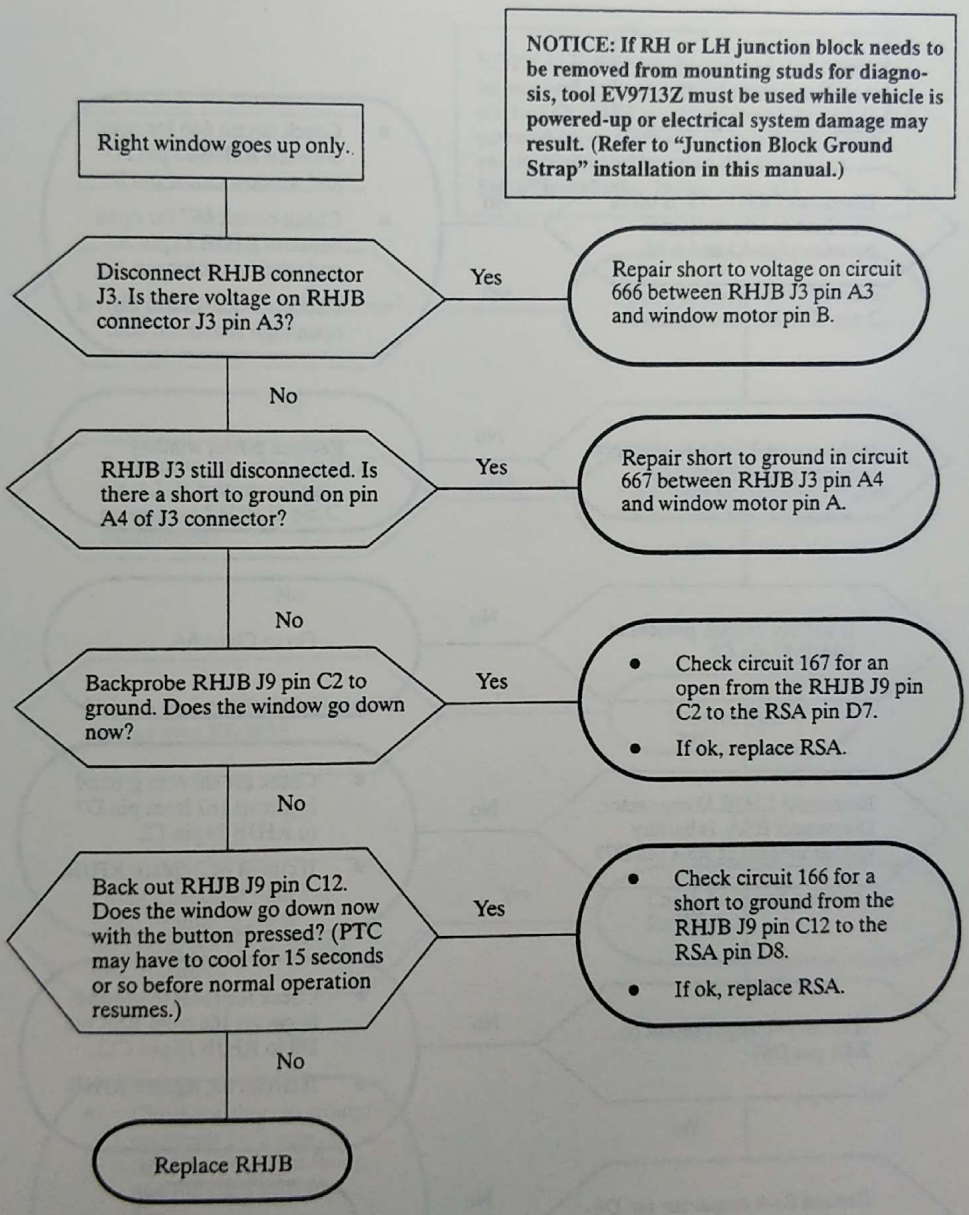
CHART 4

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



RIGHT WINDOW GOES UP ONLY

CHART 5



CamScanner

RIGHT WINDOW INOPERATIVE (NO UP OR DOWN)

CHART 6

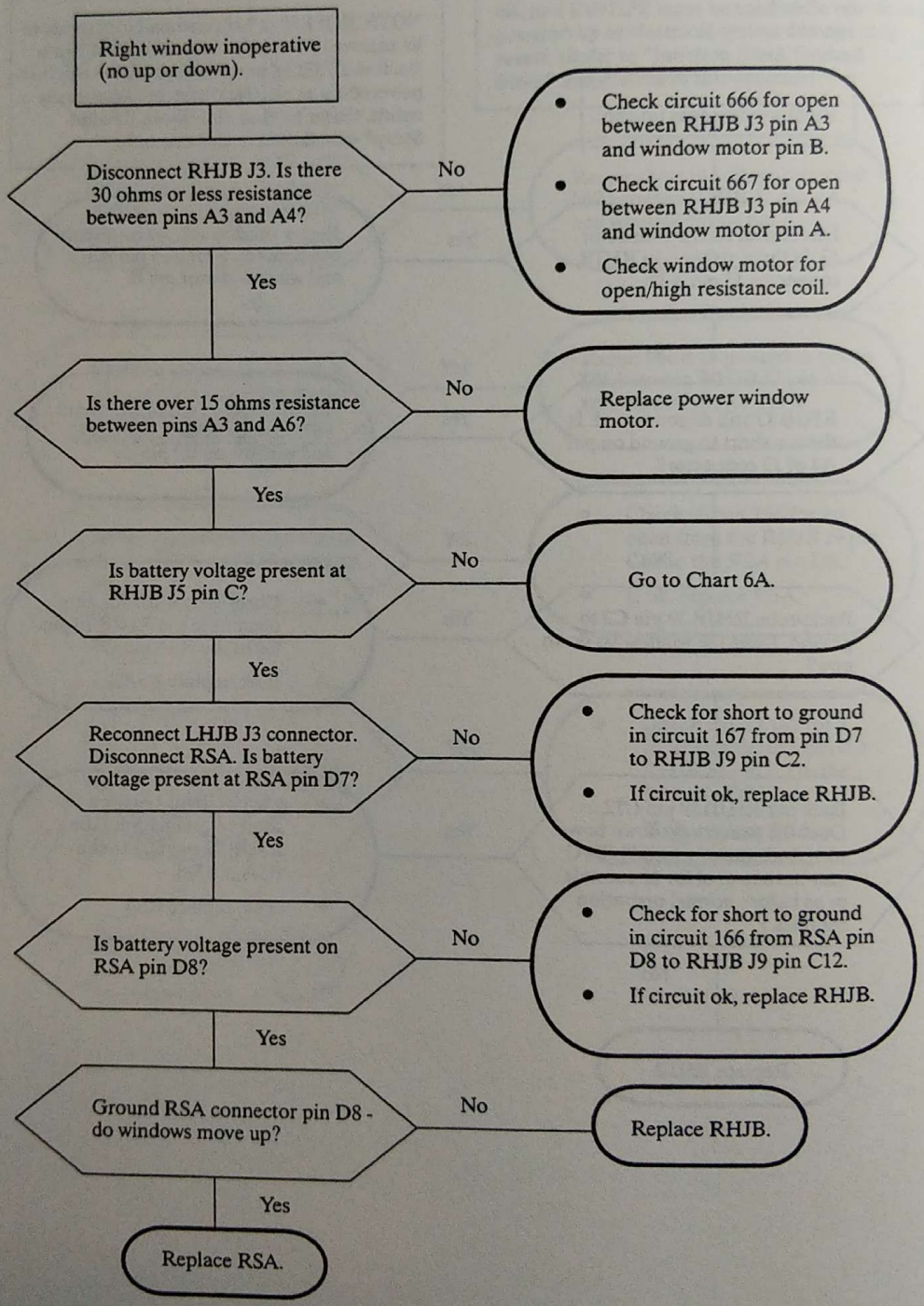
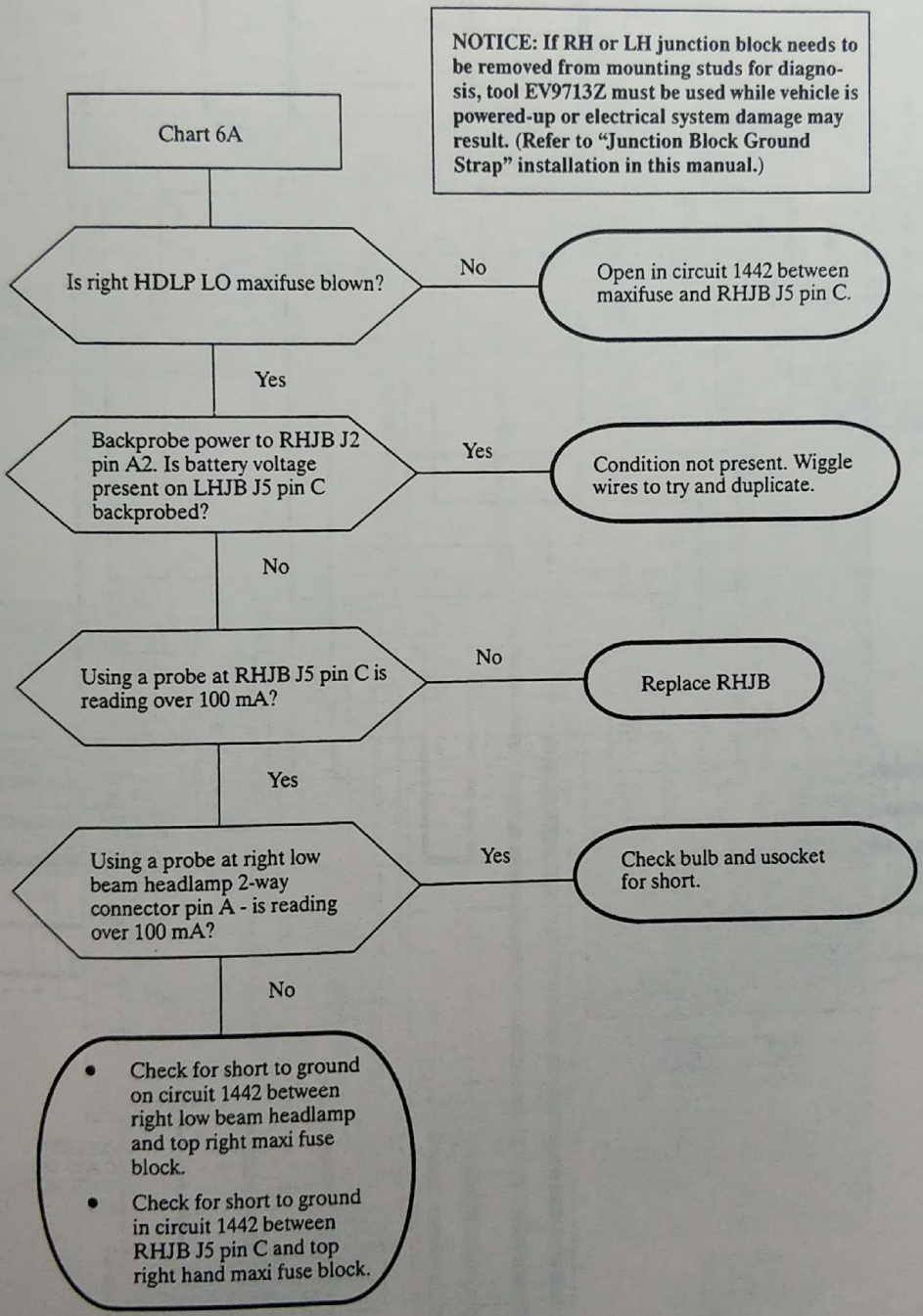


CHART 6A



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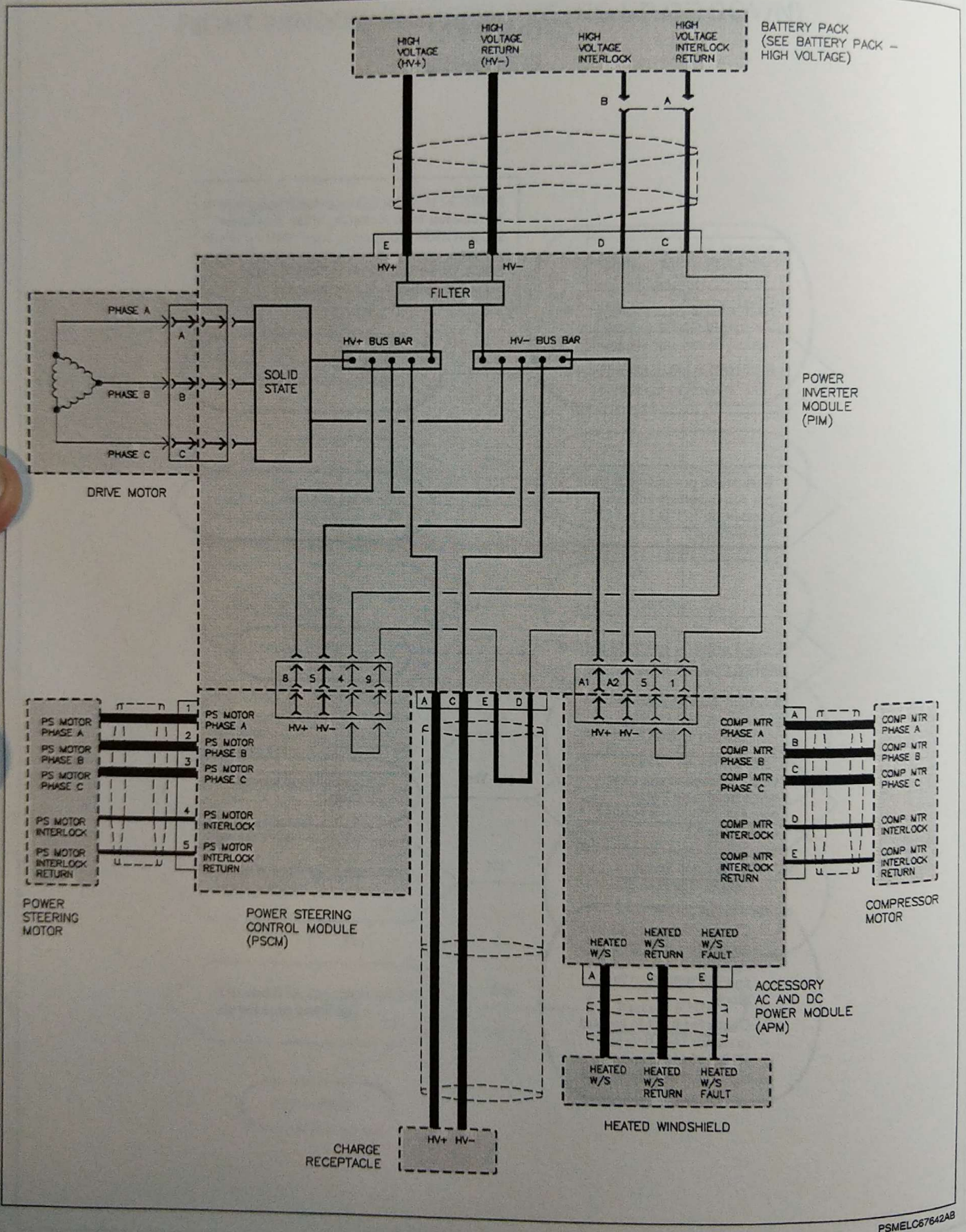
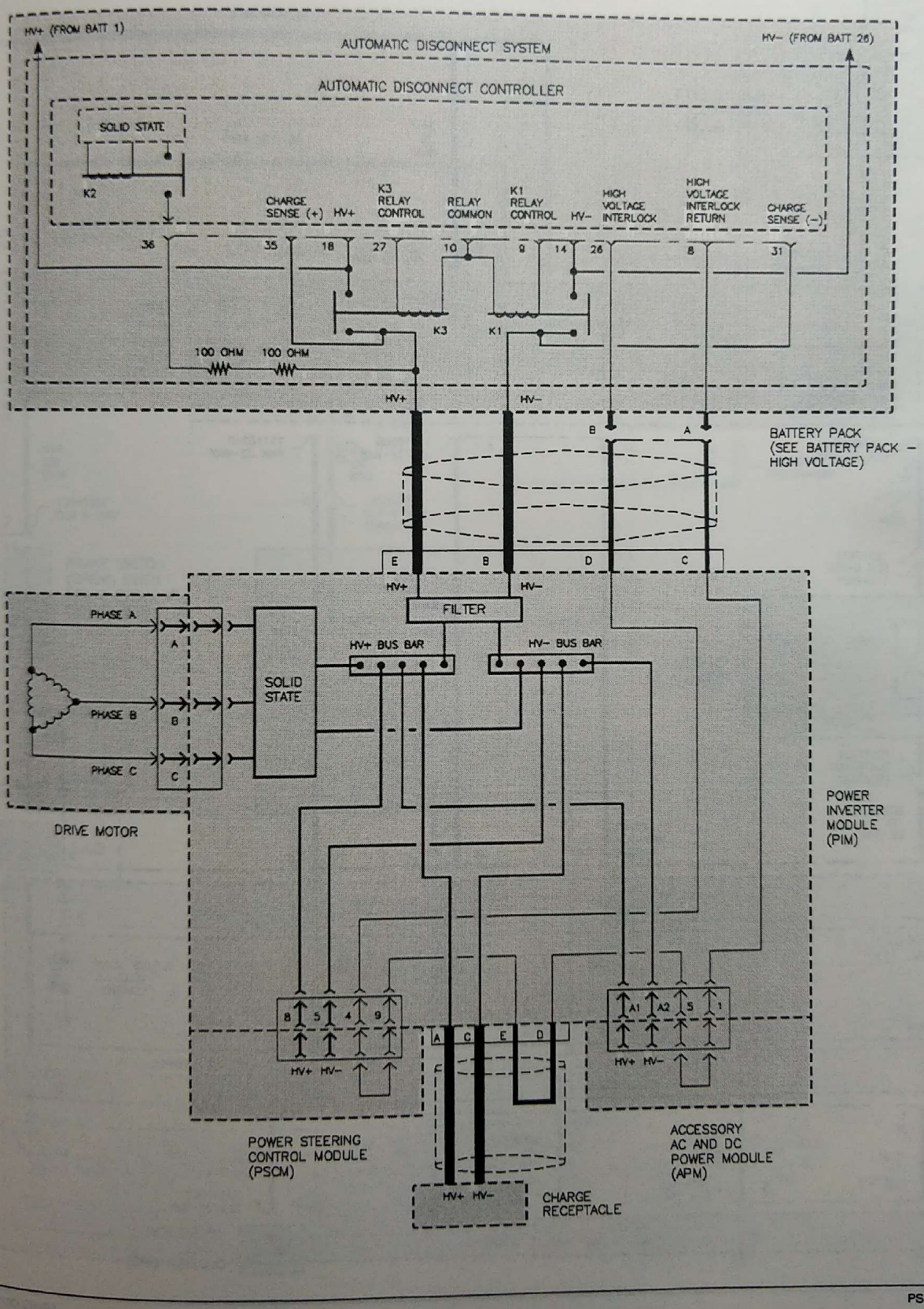
PROPULSION (HIGH VOLTAGE)



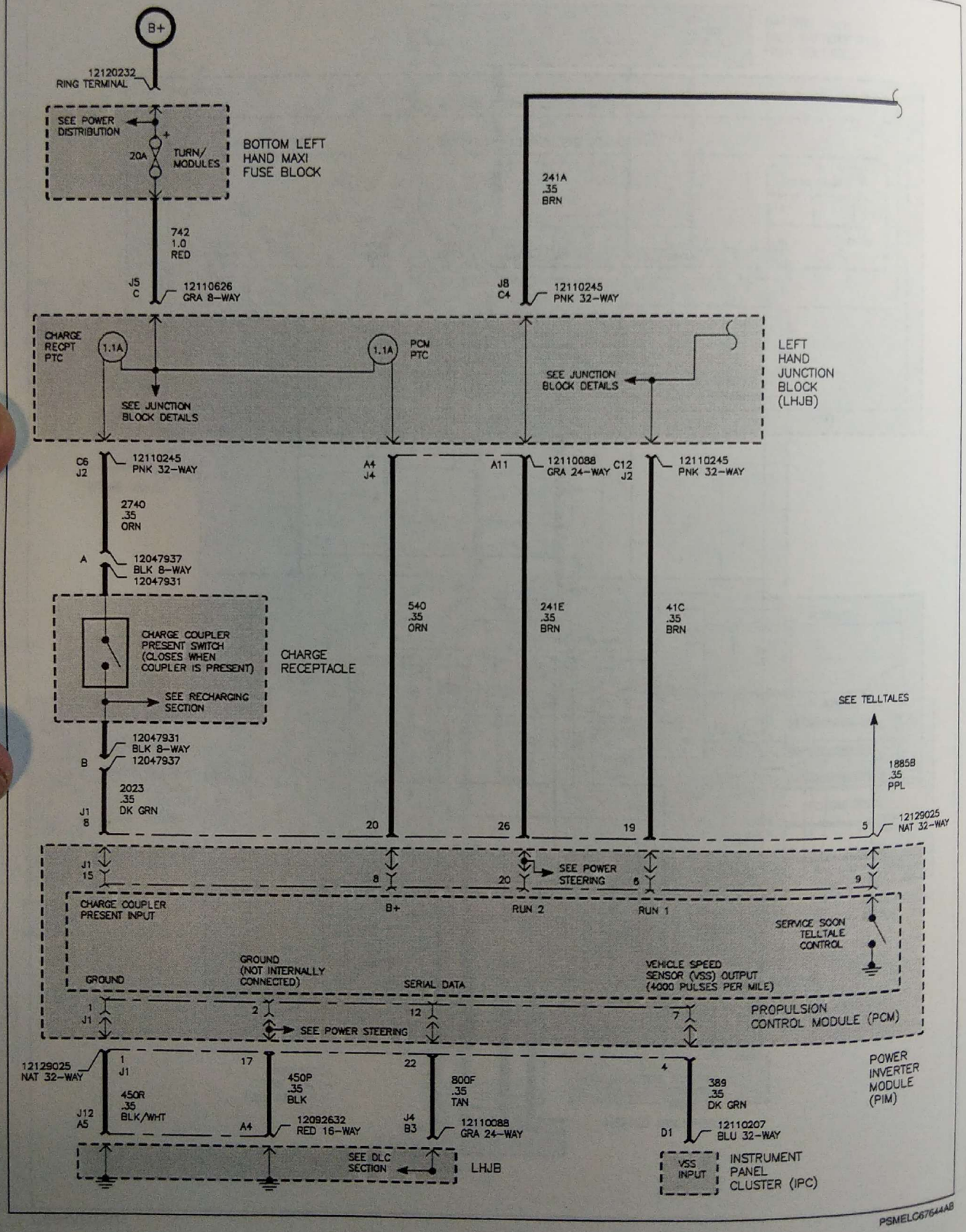
PSMELC67642AB

PROPULSION (HIGH VOLTAGE–CONT.)

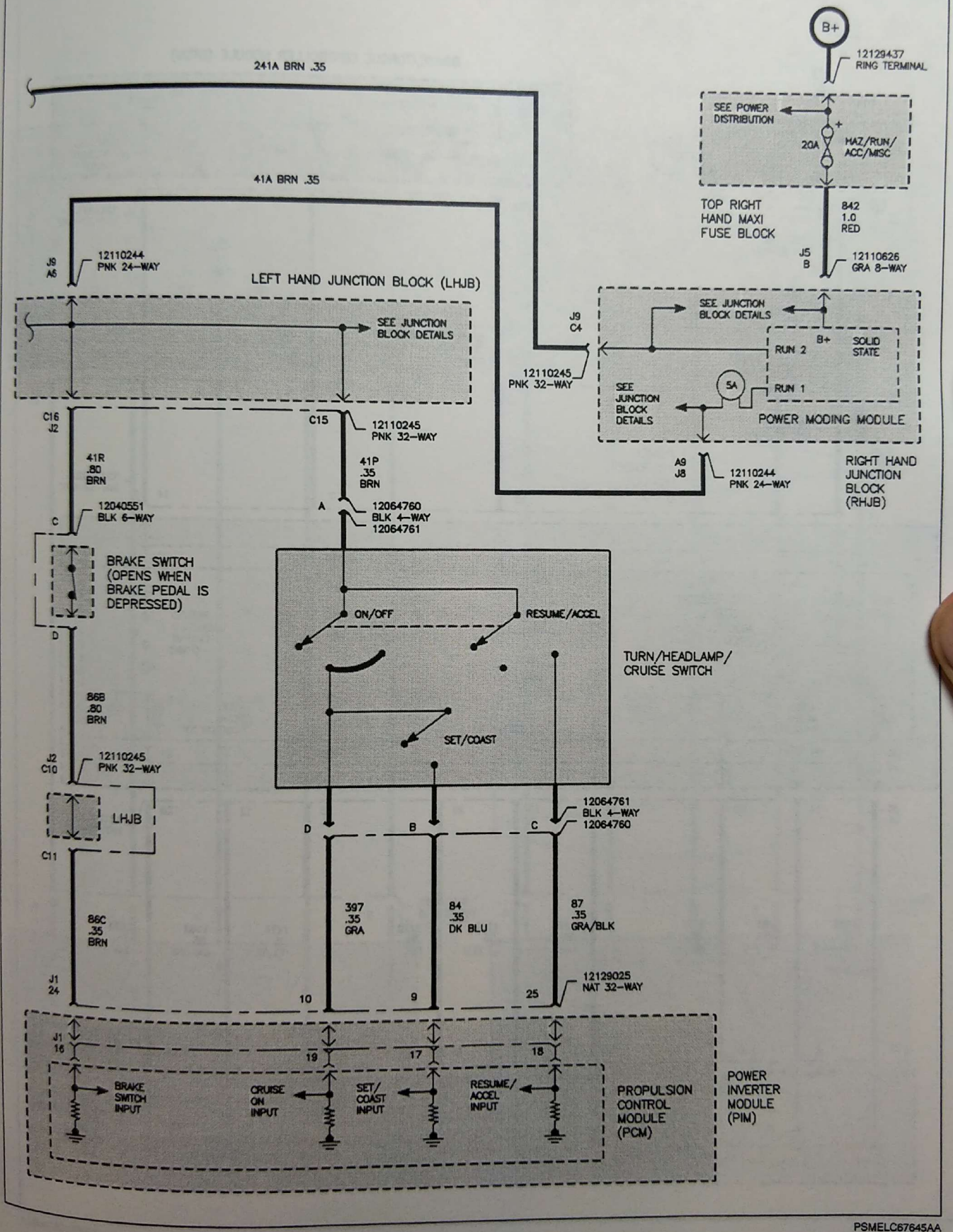


PSMELC67643AC

PROPULSION (LOW VOLTAGE)



PROPULSION (LOW VOLTAGE – CONT.)



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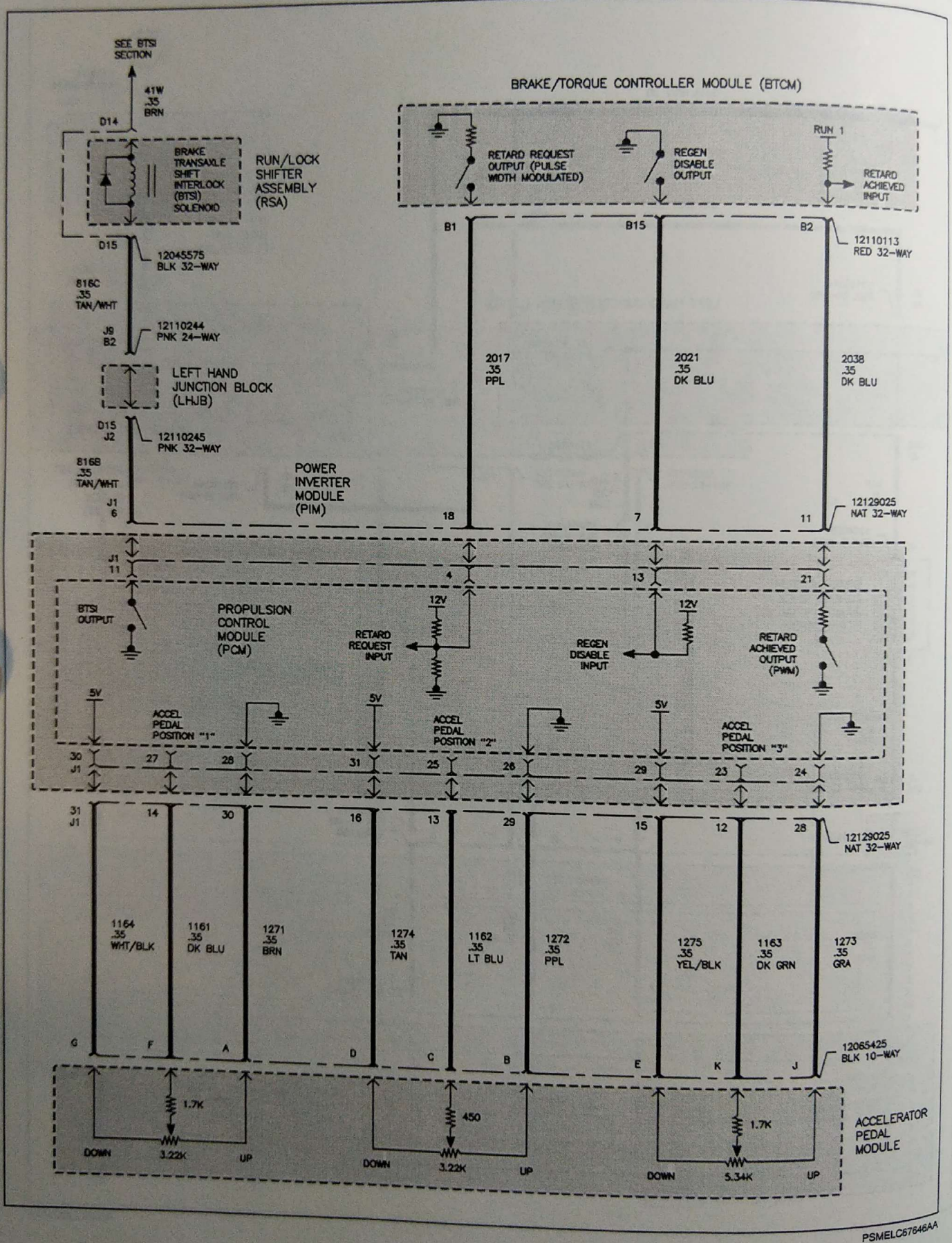
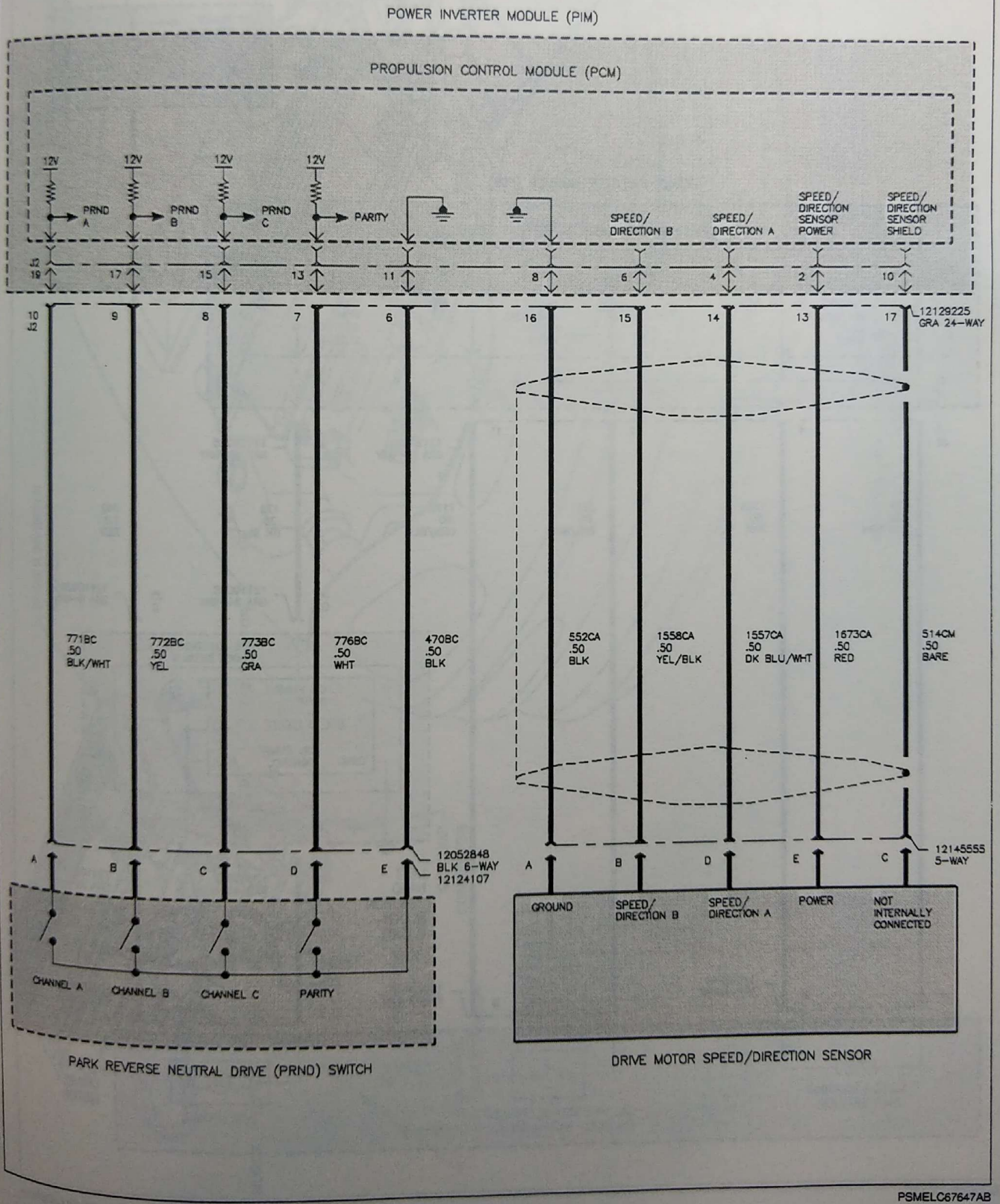
PROPULSION (LOW VOLTAGE–CONT.)



PROPULSION (LOW VOLTAGE–CONT.)



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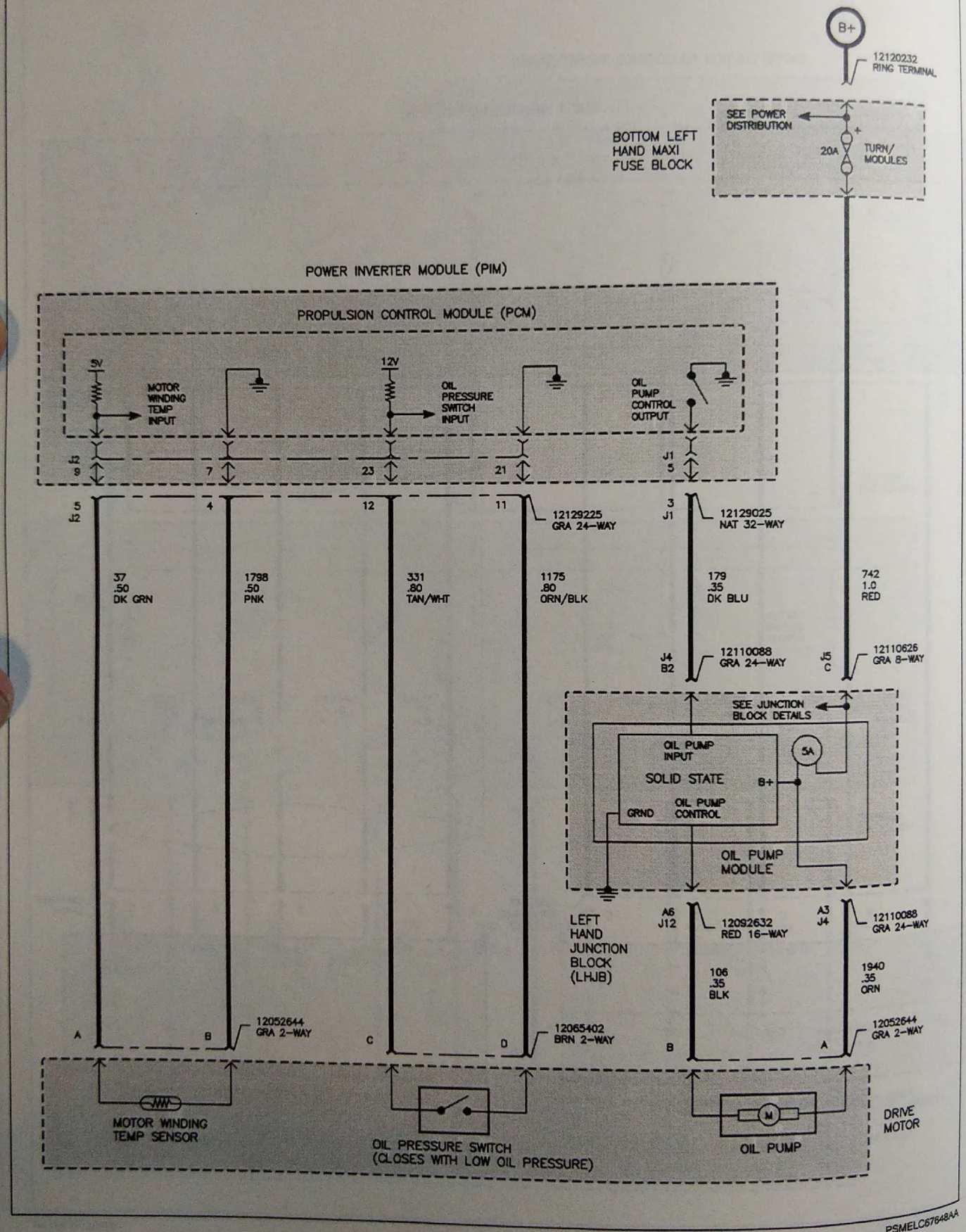
PROPULSION (LOW VOLTAGE–CONT.)



PROPULSION COMPONENT LOCATION VIEWS

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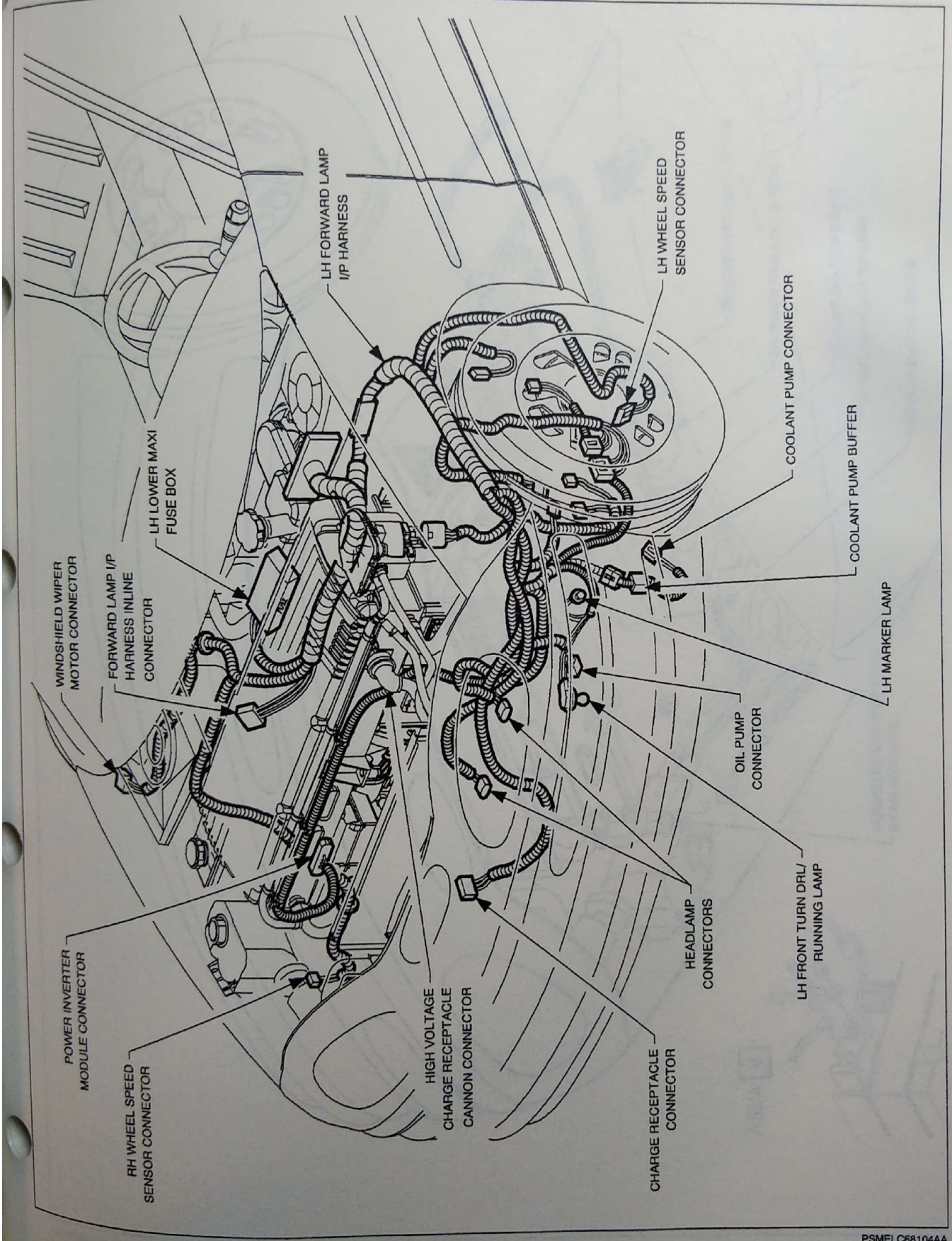
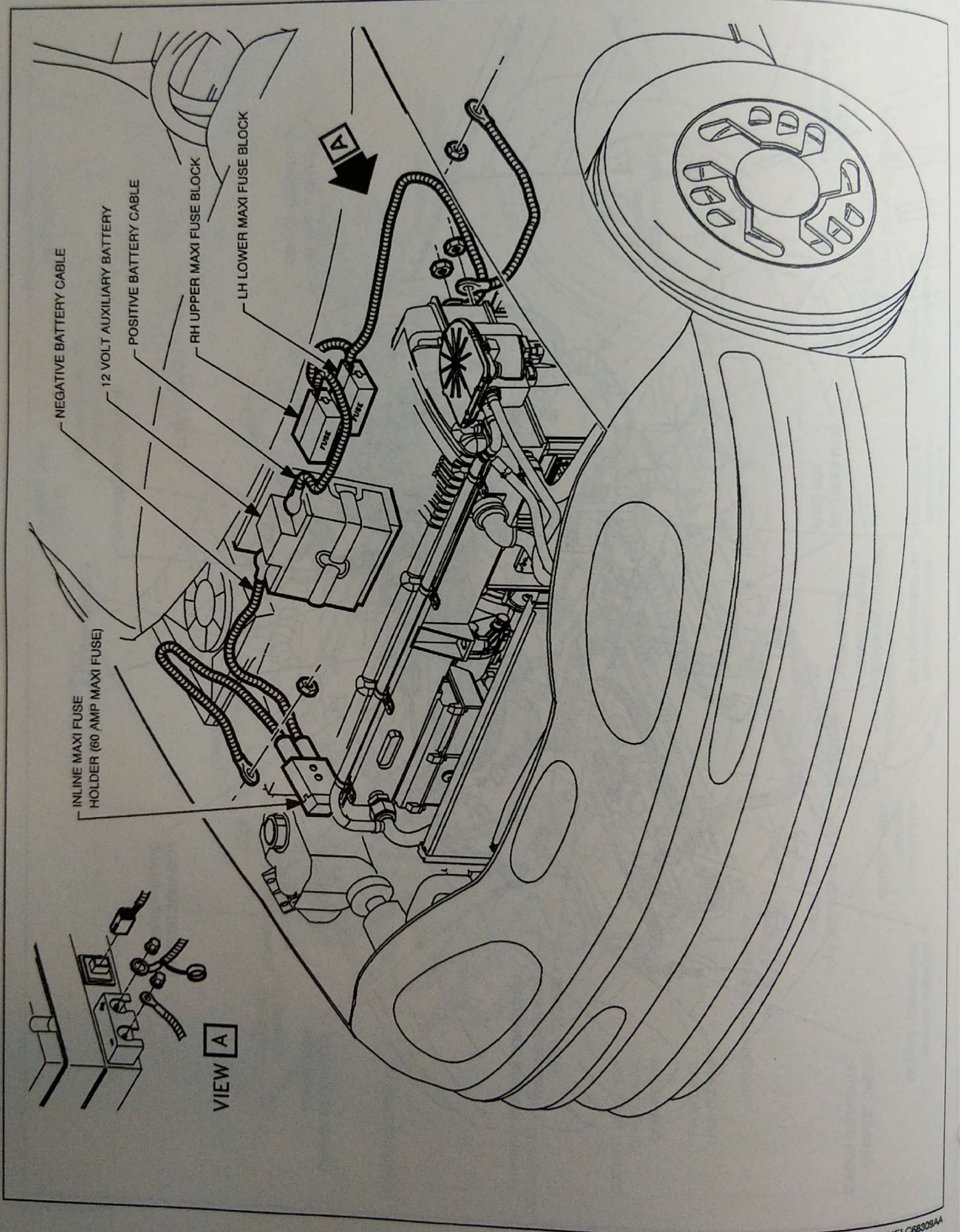
PROPULSION COMPONENT LOCATION VIEWS (CONTINUED)

PROPULSION COMPONENT LOCATION VIEWS (CONTINUED)



PSMELC68104AA

PROPULSION COMPONENT LOCATION VIEWS (CONTINUED)



NOTES

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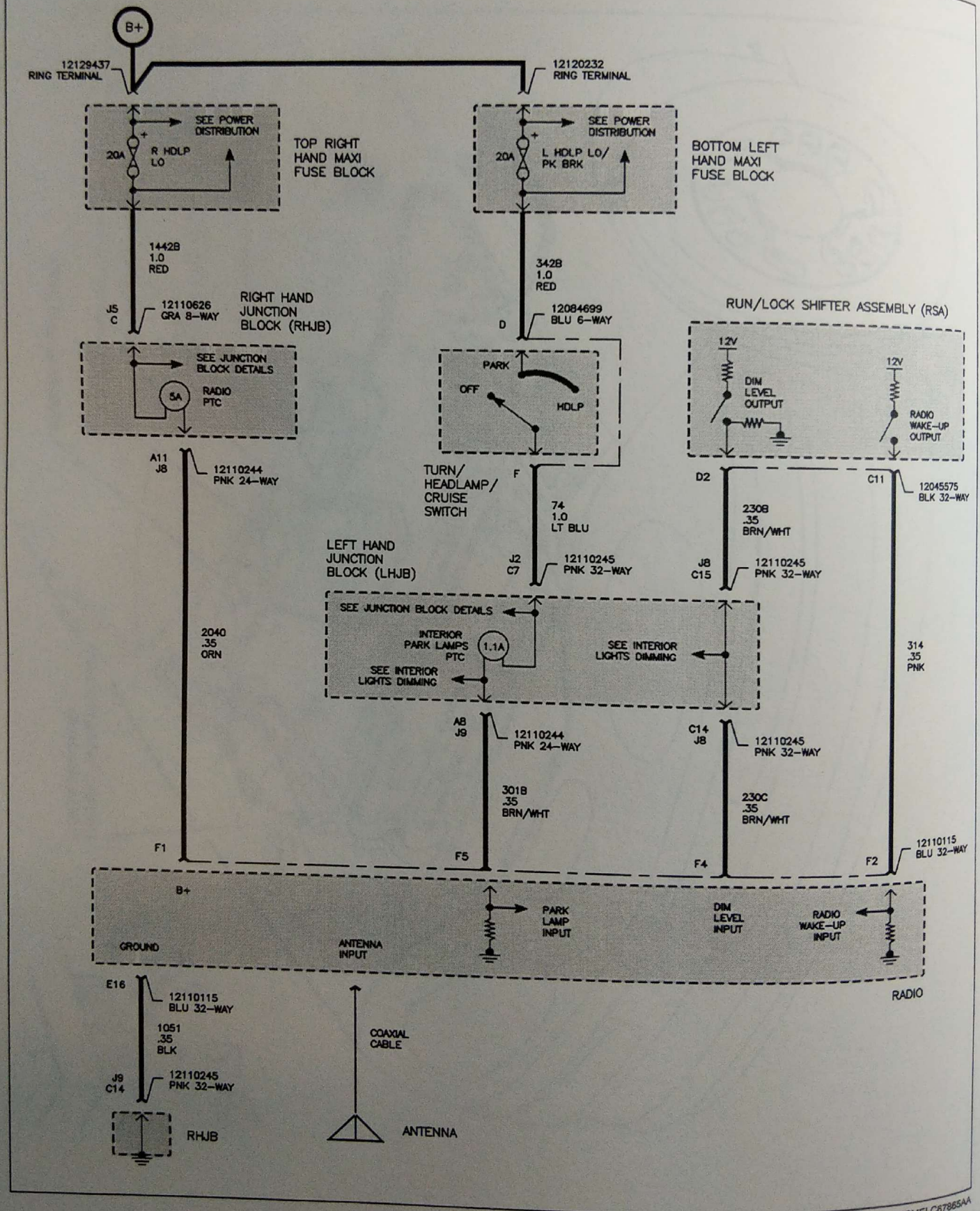
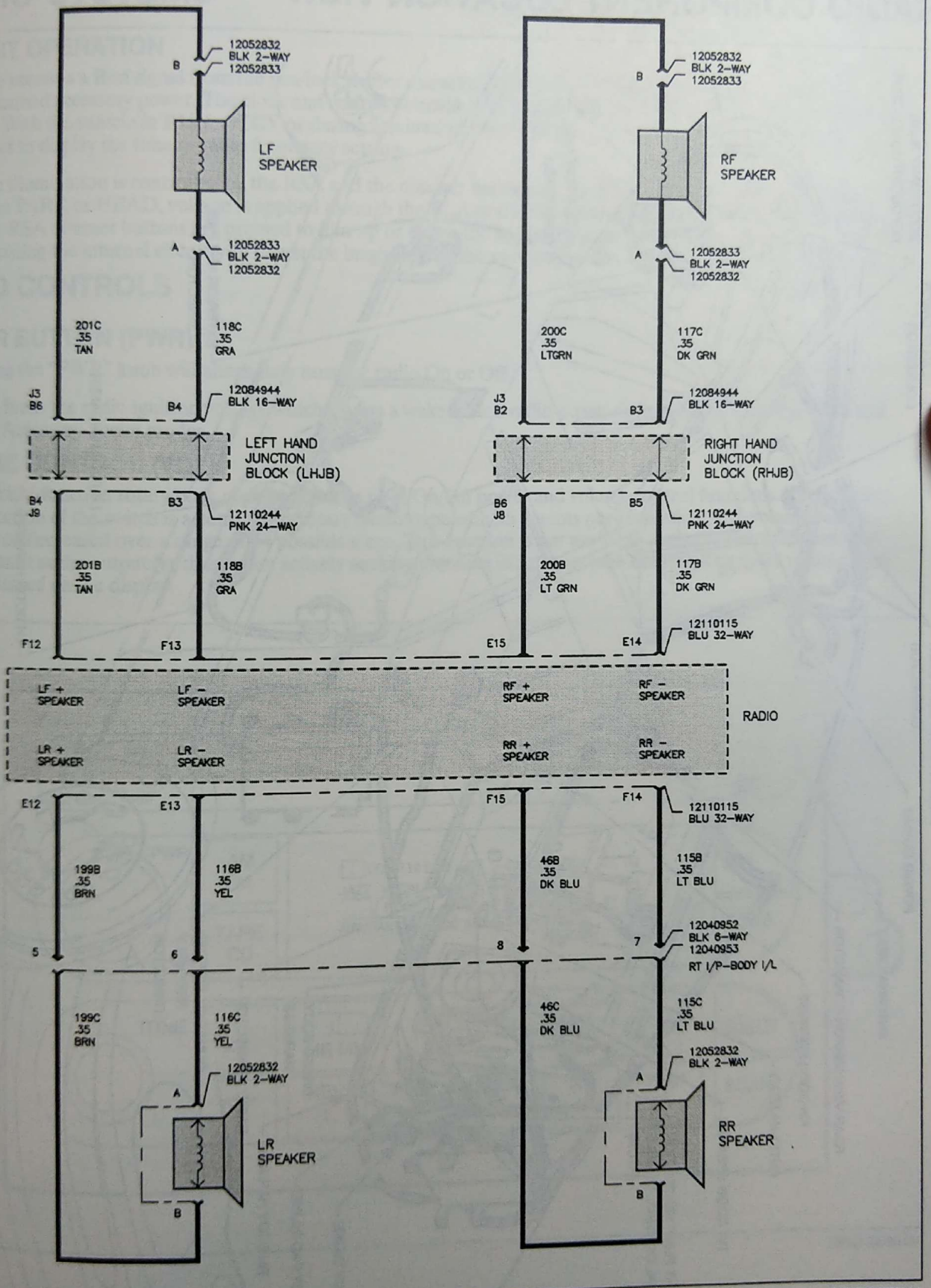
RADIO


B+
12129437
RING TERMINAL
12120232
RING TERMINAL
SEE POWER DISTRIBUTION
20A
R HDLP LO
TOP RIGHT HAND MAXI FUSE BLOCK
SEE POWER DISTRIBUTION
20A
L HDLP LO/ PK BRK
BOTTOM LEFT HAND MAXI FUSE BLOCK
1442B 1.0 RED
342B 1.0 RED
J5 C
12110626 GRA 8-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
D
12084699 BLU 6-WAY
RUN/LOCK SHIFTER ASSEMBLY (RSA)
SEE JUNCTION BLOCK DETAILS
5A
RADIO PTC
PARK
OFF
HDLP
12V
DIM LEVEL OUTPUT
12V
RADIO WAKE-UP OUTPUT
A11 J8
12110244 PNK 24-WAY
TURN/ HEADLAMP/ CRUISE SWITCH
F
74 1.0 LT BLU
D2
C11
12045575 BLK 32-WAY
2308 .35 BRN/WHT
LEFT HAND JUNCTION BLOCK (LHJB)
J2 C7
12110245 PNK 32-WAY
J8 C15
12110245 PNK 32-WAY
SEE JUNCTION BLOCK DETAILS
INTERIOR PARK LAMPS PTC
1.1A
SEE INTERIOR LIGHTS DIMMING
SEE INTERIOR LIGHTS DIMMING
2040 .35 ORN
314 .35 PNK
A8 J9
12110244 PNK 24-WAY
C14 J8
12110245 PNK 32-WAY
3018 .35 BRN/WHT
230C .35 BRN/WHT
F1
F5
F4
F2
12110115 BLU 32-WAY
B+
GROUND
ANTENNA INPUT
PARK LAMP INPUT
DIM LEVEL INPUT
RADIO WAKE-UP INPUT
RADIO
E16
12110115 BLU 32-WAY
1051 .35 BLK
J9 C14
12110245 PNK 32-WAY
COAXIAL CABLE
RHJB
ANTENNA
PSMELC67865AA



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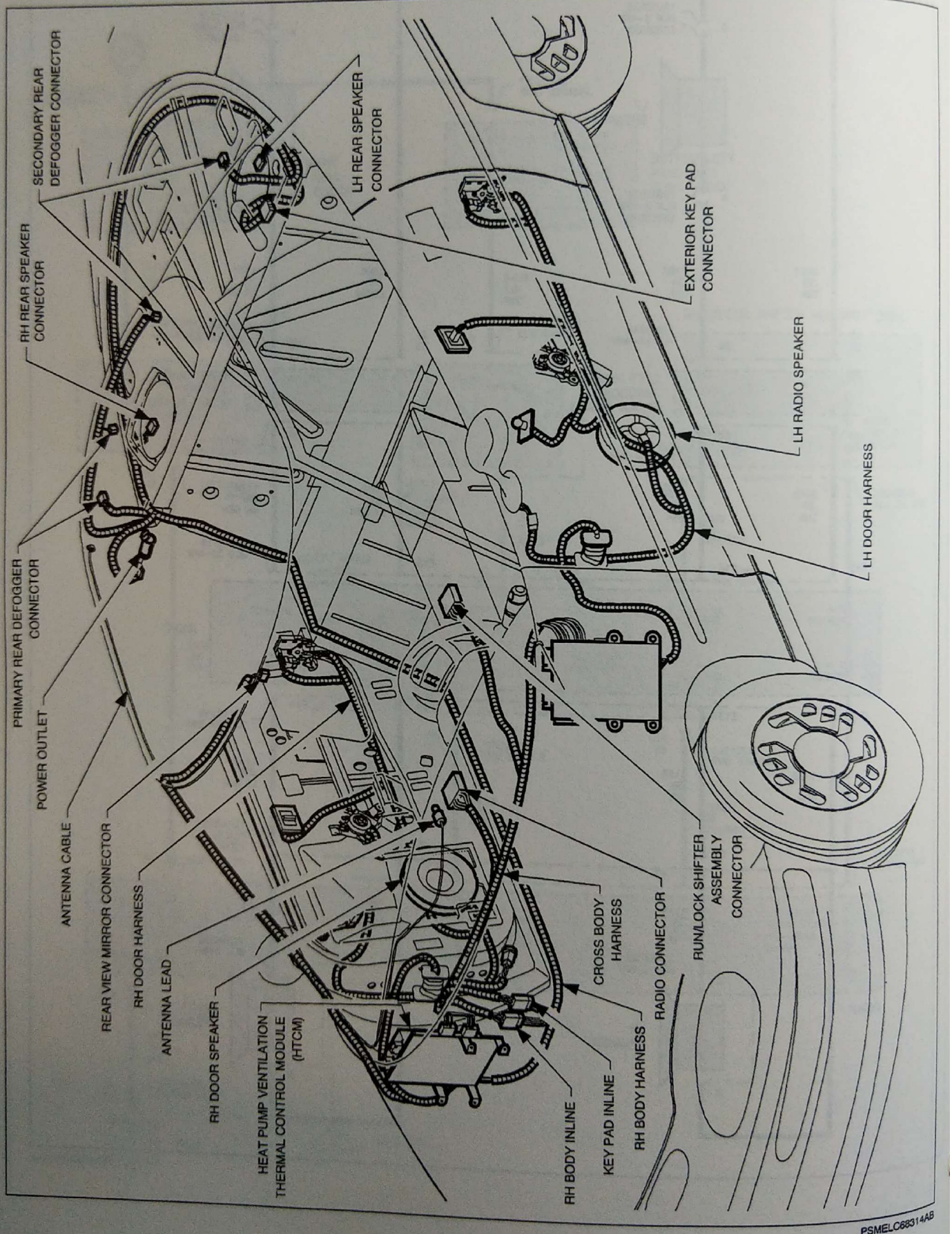
RADIO COMPONENT LOCATION VIEW



AUDIO SYSTEMS

CIRCUIT OPERATION

The radio receives a Run signal from the run/lock shifter assembly (RSA) when the vehicle is in RUN, ACCY or during retained accessory power. The clock and memory circuits receive power from the right hand junction block at all times. With the vehicle in RUN, ACCY or during retained accessory power, the vacuum fluorescent display illuminates to display the time or radio frequency setting.

The radio illumination is controlled by the RSA and the dimmer buttons on the RSA. When the head/park lamp switch is in PARK or HEAD, voltage is applied through the RSA to the radio panel lamp and the internal circuitry. When the RSA dimmer buttons are pressed to dim up or down, the appropriate level of voltage is supplied to the radio, signaling the internal circuitry to adjust the brightness of the vacuum fluorescent display to the desired level.

RADIO CONTROLS

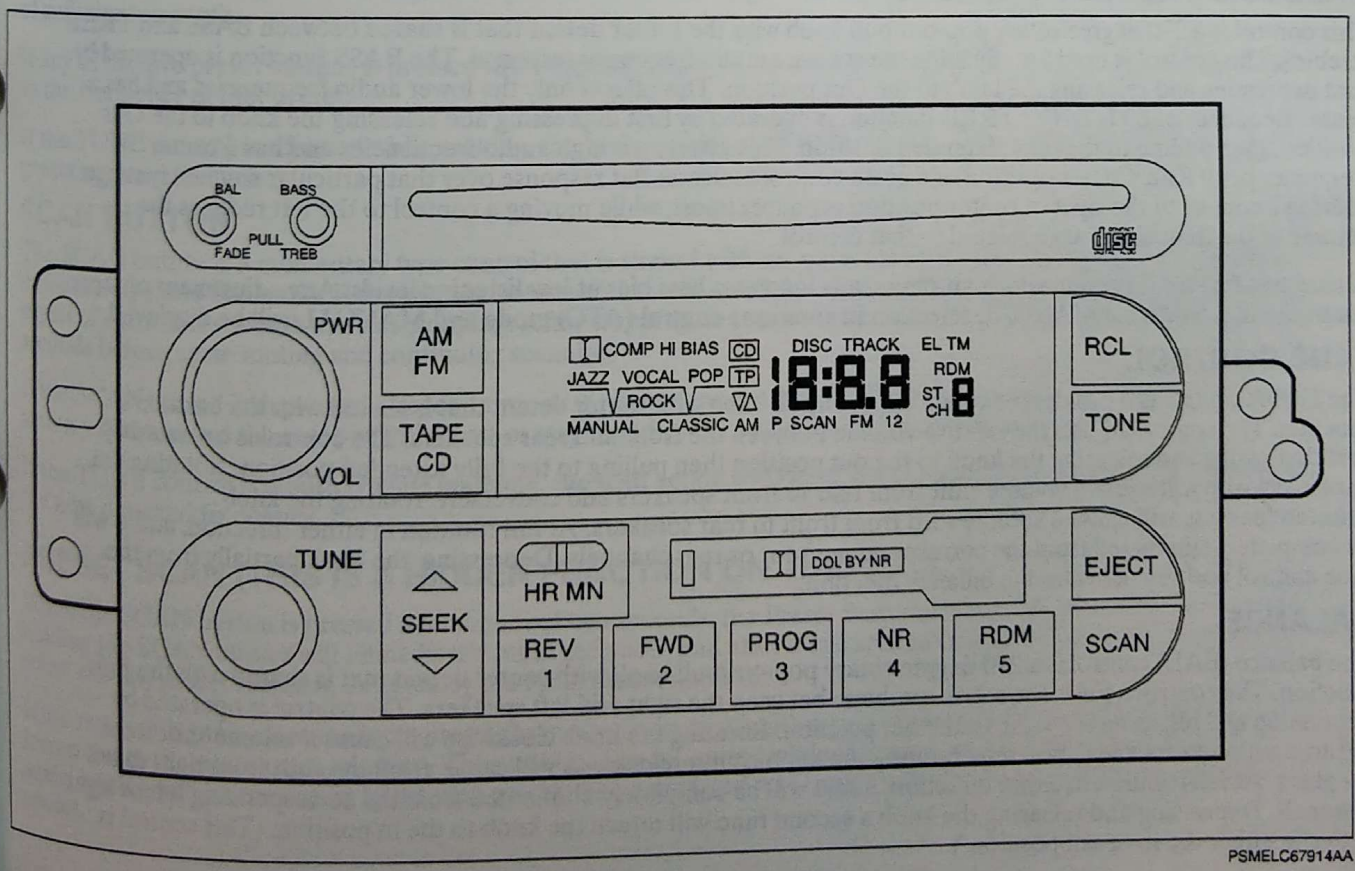
POWER BUTTON (PWR)

Depressing the "PWR" knob will alternately turn the radio On or Off.

The RSA feeds the radio ignition voltage which acts as a wakeup and radio power during the ACCessory, RUN and Retained Accessory Power modes.

VOLUME CONTROL (VOL)

A single multi-function rotary/push control provides both On/Off power and volume control functions. The volume control portion of the switch is a continuous rotary detent type with 36 detents per revolution. The volume can be increased or decreased over a range of 64 possible steps. This function is not available during radio conditions that do not permit audio output (such as when actively seeking/scanning in tuner or tape modes). The radio volume level is not indicated on the display.



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STEREO INDICATOR

ST is displayed whenever a stereo broadcast is received.

TUNE CONTROL

The tuning control is a pop-out continuous rotary knob with 20 detents per revolution. Tuning of the receiver is accomplished by turning the control in the desired direction. Clockwise turning increases the frequency while counterclockwise decreases the frequency. Frequency is increased or decreased by one channel per detent.

Adjusting the tuning control will stop the SEEK and SCAN functions. Tuning will then continue from the frequency that the receiver was at when the function was stopped.

AM-FM SWITCHING

The AM/FM button is a sequencing (push-push) type that toggles between AM, FM1 and FM2 bands. The button is active anytime the unit is On. Depressing the AM/FM button while in the receiver mode will change the tuning to the frequency last selected on the next band. Depressing the AM/FM button while in the playback mode will cause the unit to switch into the receiver mode with the last selected band and frequency.

The band switching sequence, from an initial state of FM1, is as follows:

- First push toggles the receiver to FM2
- Second push toggles the receiver to AM
- Third push toggles the receiver back to FM1

RECALL BUTTON (RCL)

The RECALL (RCL) button changes the information shown on the display with no changes to the operation of the unit. If the ignition is Off, depressing this control causes the time of day (TOD) to be displayed. The button has no effect while the ignition is On if the radio is Off, since the TOD is already being displayed.

BASS AND TREBLE CONTROLS

This control is a 270 degree rotary pop-out/pull knob with the center detent that is shared between BASS and TREB (treble). This control is used for adjusting the system's audio frequency response. The BASS function is operated by first depressing and releasing the knob to the Out position. This affects only the lower audio frequencies and has a center frequency of 60 HZ. The TREB function is operated by first depressing and releasing the knob to the Out position, then pulling to the fully Extended position. This affects the high audio frequencies and has a center frequency of 10 Khz. Center position of a given control indicates flat response over that particular frequency range. Moving a control to the right of center position produces boost, while moving a control to the left reduces the volume of the frequency range related to that control.

A loudness feature is present which automatically increases bass bias at low listening levels. Any adjustment of these controls will activate the MANUAL selection in auto tone control (ATC) mode and MANUAL will be displayed.

FADE CONTROL

The FADE control is a 270 degree rotary pop-out/pull knob with center detent that is shared with the balance function. The control adjusts the relative volume between the front and rear speakers. The control is operated by first depressing and releasing the knob to the out position then pulling to the fully extended position. Rotating the knob clockwise will cause a volume shift from rear to front speakers and conversely, rotating the knob counterclockwise will cause a volume shift from front to rear speakers. At full rotation in either direction, audio will be completely eliminated from the corresponding front or rear channels. Depressing the knob partially from the fade control position activates the balance function.

BALANCE

The balance (BAL) control is a 270 degree rotary pop-out/pull knob with center detent that is shared with the fade function. The control adjusts the relative volume between the right and left speakers. The control is operated by depressing and releasing the knob to the out position. Rotating the knob clockwise will cause a volume shift from left to right speakers and conversely, rotating the knob counterclockwise will cause a volume shift from right to left speakers. At full rotation in either direction, audio will be completely eliminated from the corresponding left or right channels. Depressing and releasing the knob a second time will return the knob to the in position. (This control is active in either the in or out position.)

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STATION PRESET SETTING

There are favorite station preset buttons, all of which service a dual role with cassette and/or compact disc player functions. When in the receiver mode, they function as station memories (1-5). When a CD or tape is being played, they perform the CD or tape deck functions.

Pressing and releasing any of the five preset buttons will recall that particular frequency, ATC setting and channel number. The audio will mute and any displayed channel number indicators will be extinguished while the button is being depressed. The unit will then tune to the desired preset UPON RELEASE of the button, as long as the button is depressed for less than two seconds. If this time is exceeded, the set mode will be activated.

The five preset buttons allow presetting five AM stations and 10 FM stations (using FM1 and FM2 bands) along with their respective ATC settings. Setting station presets is accomplished by selecting a station with either manual TUNE, SEEK or SCAN, then depressing the desired preset for at least two seconds. The audio will be muted and NO channel number will be displayed during this time-out period, after which audio is returned and the channel number is displayed, signaling the new preset frequency has been stored. The button can then be released.

The display will show frequency and channel number for five seconds after the preset is set.

SEEK BUTTONS

The SEEK button is a rocker type which provides seek up or down in the direction pressed. If the top portion of the rocker is depressed the frequencies will increase. Likewise, pressing the bottom portion of the rocker will cause seeking in the decreasing frequency direction. Depressing the button will cause the audio to mute and the frequency to increase or decrease until a signal of sufficient strength enables stopping or at the end of two complete loops.

If the selected frequency is a preset on the current band, the associated ATC mode will also be selected.

If the SEEK button is depressed a second time while seeking is underway, the seeking action will cease and the receiver will revert to its previous state just prior to the original seek command.

If the SEEK button is held in the depressed position, the seek action will begin, then stop and stay on the next signal of sufficient strength.

If any of the five preset buttons is pressed while seeking, the seeking action will cease and the receiver will be tuned to the frequency of that preset.

If the TUNE control is adjusted while seeking, the seeking action will cease and the frequency will change from the preset scanned frequency.

SCAN BUTTON

The SCAN button is a momentary type control that is shared with the preset scan feature. Pressing the button will immediately mute the audio. Releasing the button within two seconds will cause the frequency to increase until a signal of sufficient strength enables stopping. After stopping, the audio is un-muted while the tuner pauses for five seconds before again muting and continuing scanning.

If the SCAN button is depressed a second time or if no stations are found after two complete band cycles, the scan action will cease and the receiver will revert or stay tuned to the last frequency that was selected.

If the TUNE control is adjusted while scanning, the scan action will cease and the frequency will move to and stop at the next detected frequency.

PRESET SCAN (THIS IS A HIDDEN FUNCTION ON THE RADIO)

When the SCAN button is pressed a minimum of two seconds, the Preset Scan mode will be activated. Pressing and holding the SCAN button will immediately mute the audio and after a two second delay, will cause the receiver to select the last preset selection initiated by the radio preset buttons.

If the receiver is presently tuned to a preset that was selected with either one of these buttons, the receiver will increment to the next preset selection. The audio is then un-muted while the tuner pauses for five seconds before again muting and incrementing to the next preset. The associated ATC mode will also be selected along with the preset.

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SETTING TIME OF DAY

Time-of-day (TOD) is set using the hour (HR) and minute (MN) buttons. There will be an initial delay of two seconds after first button depression, before the unit will enter the time set mode and the time will advance.

- When the time set mode is entered, the display will show TOD along with an A (AM) or P (PM).
- Depressing HR will cause hours to increase, while depressing MN will cause minutes to increase.

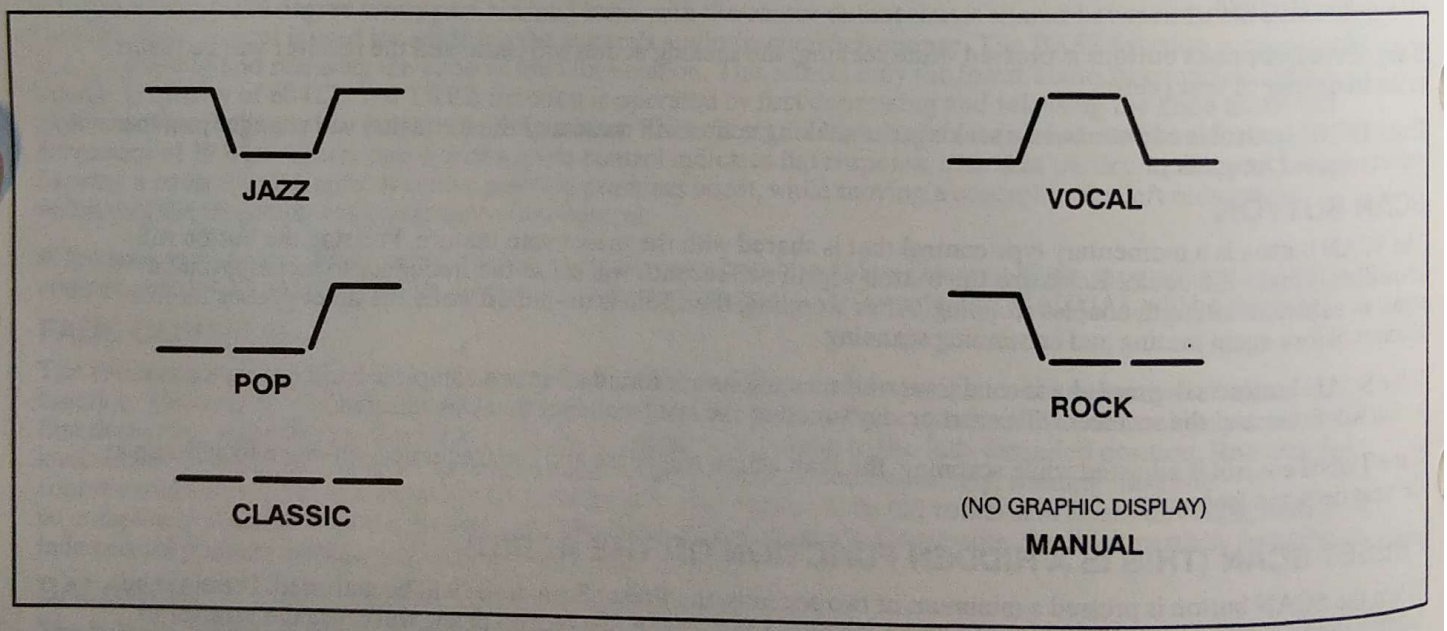
If the electrical power is interrupted by a blown fuse, discharged battery, etc., the clock must be reset.

TONE CONTROL

The TONE button is a sequencing (push-push) type switch that switches between predetermined frequency response curves and a manual mode (BASS and TREB controls functional). The sequence is as follows in a *continuous loop* configuration:

- **JAZZ**
- **VOCAL**
- **POP**
- **ROCK**
- **CLASSICAL**
- **MANUAL**

When a specific ATC mode is selected with the tone button, it becomes the default. This ATC setting will be stored along with receiver preset frequencies and be recalled when the preset is selected. The radio will display the graphical frequency response curve representations as shown.



CASSETTE TAPE PLAYER

TAPE LOAD

The cassette player incorporates a power load cassette mechanism with an illuminated slot opening. The tape is partially inserted through the door in the front of the trimplate, after which the mechanism completes the loading cycle automatically. After loading. the cassette player automatically senses the tape cartridge for metal tape or CRO2 usage. The appropriate adjustments are made within the player and the cassette is ready to be played.

EJECT BUTTON

Depressing the EJECT button ejects the cassette tape and returns the audio to the radio mode if the unit is ON. The eject function is operative from all modes of cassette operation and while ignition is OFF.

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FAST REVERSE BUTTON (REV)

The Fast reverse (REV) button is a non-latching momentary contact control that serves a dual function with radio preset #1. Depressing REV button moves the tape in the reverse direction at a rapid speed until this button is depressed a second time or the program button is depressed to return the unit to the normal play mode. During rewind, the audio reverts to the radio. If no operator changes occur, rewinding continues until the beginning of the tape is reached, whereupon the unit returns to the play mode. Time of Day (TOD) will remain displayed and a program arrow will blink while in the fast reverse mode.

FAST FORWARD BUTTON (FWD)

The Fast forward (FWD) button is a non-latching momentary contact control that serves a dual function with radio preset #2. Depressing the FWD button causes the same operation as described in fast Reverse Button (REV) in this section, except the direction of tape travel is in the forward direction. The corresponding program arrow is lit while the fast forward mode is selected.

SEEK BUTTON

The seek button is a rocker type switch which provides seek up or down of tape selections in the direction pressed, while in the tape mode. A blank spot of three seconds minimum duration is required for the deck to recognize it as a pause between selections.

- If the top portion of the rocker is depressed, audio will be muted while the deck searches for the BEGINNING of the next tape selection.
- If the bottom portion of the rocker is depressed, audio will be muted while the deck searches for the beginning of the CURRENT selection being played.

PROGRAM BUTTON (PROG)

The program (PROG) button is a momentary contact control. Depressing the PROG button causes the tape deck to reverse play direction and changes the indicator arrow direction.

DOLBY

The Dolby Noise Reduction (NR) button is a non-latching momentary contact control that serves a dual function with radio preset #4. Depressing this control in the tape mode, switches Dolby B noise reduction OFF or ON. A Dolby symbol will appear in the display while in the tape mode and this function is active.

COMPACT DISC PLAYER

NOTICE: Do not attempt to insert any disc into a CD player except those discs which display the symbol shown (see illustration) on the disc label. Insertion of a disc which does not display this symbol may cause damage to the CD player and/or disc. An adapter ring must be used for playing 8 cm disks.

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POWER CYCLING

If the CD is playing when ignition voltage is removed, upon reapplication of power the unit resumes playing from the position reached prior to power down. CD VF display shows track selected and CD IN.

If battery and ignition is removed from the unit, upon reapplication of power the radio is in the OFF mode and indicates the time of day, the CD IN lamp turns ON. When the radio is turned On, the CD is initialized and starts to play track one and CD IN lights along with time of play. After five seconds the track selection is displayed.

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PRIORITY STRUCTURE

The last function selected is the function that has priority. If a compact disc is inserted while the radio is ON, the radio shifts to the disc mode after the disc is initialized and starts playing the disc. The CD player is given priority by the radio.

CD LOAD

The CD is inserted approximately 1/2 of the way after which the mechanism completes the loading cycle automatically and begins to play track one on the disc. The CD load function is available at all times that a cartridge is not presently loaded.

CD EJECT

This function is available in all modes of operation and with ignition ON or OFF. With the radio and ignition ON, pressing the EJECT button mutes the disc and the audio switches to the previous radio function. The loading motors eject the disc and the CD indicator turns Off. At any time, with radio or ignition ON or OFF, an ejected disc that is not removed from the CD load mechanism within 25 seconds will automatically be reloaded but the play mode will not be activated.

PLAY

The CD (Tape/CD) button is a sequencing momentary contact type switch that causes the unit to enter the playback mode. The operation of this control is explained under the following two conditions:

- With NO cassette loaded. Depressing this button with a CD loaded will cause the CD to begin playing. This button will have no effect if a CD is not presently loaded.
- With both CD and cassette loaded. Depressing this button will cause the last selected playback device to start playing. Pressing the button repeatedly will toggle between playbacks.

Depressing the TAPE/CD button, from all modes of CD deck operation (excluding stop), causes the CD mechanism to halt and the cassette to start playing. Depressing TAPE/CD with a cassette active and a CD loaded, will cause the cassette deck to stop and the CD to resume playing from the same location as when stopped. Play will be continuous with a wrap back to the first track after the last track has completed. If ignition is turned OFF or if the unit is turned off with any CD mode active, the unit will revert to the play mode, from the previous location, upon reapplication of ignition voltage and radio power-up. A box will appear around the CD symbol in the display when the CD becomes active.

STOP

The CD playback can be stopped by either the AM/FM button, the TAPE/CD button, ejecting a disc or loading a tape. Depressing the AM/FM button will switch the unit to the radio mode with the last frequency and band selected.

The TAPE/CD (TAPE) button will switch the unit to cassette mode with a cassette loaded. Loading a tape will switch the unit to the cassette mode. Ejecting the disc will switch the unit to the tuner mode.

SEEK

The SEEK button is a rocker type switch which provides seek up or down of CD tracks in the direction pressed while in the CD mode. This button is shared with the frequency seek function in tuner mode and with cassette seek.

- If the top portion of the rocker is depressed, audio will be muted as the deck moves to the beginning of the next track, then begins playing. Each successive momentary press of this button will increment the track number by one.
- If the bottom portion of the rocker is depressed, audio will be muted as the deck moves to the beginning of the CURRENT track, then resumes playing. If this function is enabled within the first eight seconds of a track, the unit will go to, then start playing the beginning of the PREVIOUS track. Each successive momentary press of this button will decrement the track number by one.

SCAN

The scan button is a non-latching control which provides forward scanning of CD selections. This button is shared with the frequency scan function in tuner mode and with cassette scan function. When the SCAN button is depressed, audio will be muted as the deck increments to the beginning of the next track. The unit will then begin to play the first 10 seconds of the track prior to again incrementing and playing the first 10 seconds of each consecutive track. If the SCAN button is again pressed while the function is active, the SCAN function will be canceled and the present track will continue playing. The SCAN symbol along with the Track # will appear in the display while in the CD scan mode.

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RANDOM

The Random (RDM) button is a non-latching control. Depressing this control in the CD play mode causes the current selection to stop playing while a random playback order is chosen by the microcomputer. Play then resumes with the tracks being played in the random order that was chosen. When the final selection has been played, the unit will continue play in the original random order. Pressing the random button at any point during random playback causes the playback to continue in the normal sequence beginning with the current track.

The Random symbol (RDM) will be displayed when the feature is active.

FAST REVERSE

The fast reverse (REV) button is a non-latching momentary contact control. This button is of a press and hold nature. The button allows reverse movement within the disc at a faster rate than normal playback rate as long as the button is held. When activated, the audio level is reduced by 6dB and the disc will play in the reverse direction at a rate of six times normal speed.

Elapsed time within the selected track will be displayed while in the REV mode. The track number, followed in five seconds by elapsed time, followed in five more seconds by the user selected default will be displayed after the REV button is released.

FAST FORWARD

The fast forward (FWD) button is a non-latching momentary contact control. Operation of this feature is the same as the fast Reverse (REV) button only the movement will be forward rather than reverse.

NR BUTTON

The NR button does not perform a special function in CD mode.

VF DISPLAY

The display is a 3 1/2 digit vacuum fluorescent display with a nonflashing colon (used in time) and various indicators. This display exhibits even color and brightness over the full brightness range of the dimming control. Dimming is controlled by the RSA.

ERROR (ERR) DETECTION

The unit indicates ERR in the VF display if the focusing mechanism is impaired by moisture, or if tracking or servo problems occur, of if a disc is inserted upside down. The unit switches to the radio mode and ejects the CD. If a CD is inserted upside down, the CD player is not able to initialize and the unit will not shift into the audio modes. The ERR graphics turn off after five seconds or sooner if the disc is reinserted correctly.

ERR is not lit unless the CD player is active and in the play mode or the ambient temperature exceeds a preset temperature and the CD operation is either not functional or in jeopardy of damaging the laser. The disc ejects and ERR lights in the VF tube. If the temperature is too high the ERR is maintained in the VF display until the CD player cools to a safe operating temperature. While ERR is displayed the unit will not accept CDs.

MODE SWITCHING

The unit gracefully changes status without popping on the audio lines. Lapses are not longer than two seconds between switching sources and after initialization has occurred there are no pauses.

SPEAKERS

The EV audio system consists of four speakers: one in each door and two in the rear.

THEFT DETERRENT (THEFTLOCK)

Theftlock will cause the radio to become inoperative if battery power is disconnected for more than 15 seconds when the unit is in the secured state. A DTC entry scheme is used to secure and unlock the radio.

The theft deterrent is ENABLED by the following sequence of operations:

1. With battery and ignition voltages applied and radio OFF.
2. Depress preset buttons 1 (REV) and 4 (NR or RDM) for five seconds. The VF display will show "___" indicating the unit is NOT in the secure mode.
3. Using the HR and MN buttons, enter any DTC number. The initial key press of either button will cause the display to indicate 000, the last three digits of the 3 1/2 digit user DTC. Subsequent key presses of the HR button will cause the left 1 1/2 digits to increment and depressing the MN will cause the right two digits to increment. The digits will continuously increment at a rate of once every one second for the first two increments and then once every 250 milliseconds, as long as the button is pressed. The digits will also increment by one with every momentary depression.

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4. Depress the AM/FM button. The display will now show REP for five seconds, indicating that the steps to re-enter the 3 1/2 digit DTC will need to be repeated for verification.
5. Re-enter the 3 1/2 digit DTC according to step 2.
6. Depress the AM/FM button. If the display shows SEC, the verification was successful and the system is in the SECURE state. If the display shows "___", the verification steps were not successful and the entire sequence must be started from the beginning.

The display will revert to TOD after 15 seconds. The Theft Deterrent is DISABLED from the SECURE mode by the following sequence of operations:

1. Battery and Ignition voltages applied and radio OFF.
2. Depress buttons 1 (REV) and 4 (NR or RDM) for five seconds. The display will show SEC, indicating the unit is in the SECURE mode.
3. Using HR and MN buttons, enter the correct DTC number. The initial key press of either button will cause the display to indicate 000, the last three digits of the 3 1/2 digit user DTC. Subsequent key presses of the HR button will cause the left 1 1/2 digits to increment and depressing the MN button will cause the right two digits to increment. The digits will continuously increment at a rate of once every one second for the first two increments and then once every 250 milliseconds, as long as the button is depressed. The digits will also increment by one with every momentary depression.
4. Depress the AM/FM button. If the display shows "___", the disabling sequence was successful (the numbers matched the user-selected DTC or the factory backup DTC) and the unit is in the UNSECURED state. If the display shows SEC, the numbers did not match either of the DTCs and the unit will remain in the SECURE state. The display will revert to TOD after 15 seconds.

DIAGNOSIS/TROUBLESHOOTING HINTS

RADIO

The radio is the bridge audio type, using two wires to each speaker. It is very important when changing speakers or performing any radio work to avoid pinching the wires. A short circuit to ground from either wire causes damage to the output circuit in the radio.

Many conditions that affect radio operation may be corrected without removing the radio from the vehicle. Verify the condition and follow the diagnosis in the appropriate trouble tree to isolate and determine the cause of the problem. Before attempting to diagnose radio problems with a low battery, be sure that the vehicle is fully charged. If the radio power supply drops below nine volts, AM or FM problems may be induced.

Because radio service problems are corrected at authorized warranty repair stations, the tendency is to remove the set when a problem is reported, without any preliminary diagnosis. A large number of radios received by warranty repair stations are found to be okay. This indicates that the trouble could have been corrected without removing the radio.

If possible, determine from the owner the exact nature of the radio problems as an aid to diagnosis. Knowing whether the condition is intermittent or constant, whether the vehicle is in Run or Accesory, whether it is stationary or moving, will help to pinpoint the problem. Also, check that the antenna is not damaged (above the headliner) and that the lead-in is not at fault. (Refer to "Antenna Diagnosis" in this section.)

RADIO INOPERATIVE HINTS

For checking a speaker, use a C or D cell battery and momentarily connect and disconnect it across the circuits to that speaker while listening for a slight popping sound or watching for the cone of the speaker to move in and out. If either happens, the speaker and circuitry are usually ok.

Check radio power at pins F1 and F2.

Check ground circuit 1051 pin E16 to RHJB J9 pin C14.

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RADIO NOISE HINTS

Test the radio outside and away from building with the hood down.

Check antenna coax connectors for corrosion or bad connections.

If a test antenna is used, ground the base of the antenna to a vehicle ground.

When shielding components, use aluminum foil tape (nickel tape works best for magnetic interference) and ground the end of the shield.

Most noise can be found on weak AM stations near the low end of radio band.

Coated screws or bolts may cause ground problems.

Before removing a speaker, check all accessible wiring and connectors to that speaker.

FM STEREO

FM broadcasts are line of sight from station antenna to receiving antenna. The range is often limited to 40 km (25 miles) or less for steady reception. Beyond that noise and flutter may begin to appear due to the line of sight range limitation of FM signals. Tall buildings or hills may cause shadows or cancellation of FM signals (this is similar to the ghost or flutter effect seen on television sometimes when airplanes are flying in the vicinity). It will sound like a pop or momentary hiss. Turn down the treble setting to help reduce these noises.

AM STEREO

AM stations broadcasting C-QUAM® stereo may be automatically processed in stereo if the receiver has this feature. Switching to stereo improves fidelity, but may increase noise on weaker stations. AM does not have the flutter characteristics of FM (caused by tall buildings, hills, etc.). However, it is subject to interference from power lines, neon signs, atmospheric conditions, overpasses, and unwanted stations. To help reduce noise try turning down treble. Refer to the trouble trees in this section for specific diagnosis of static and noise.

ANTENNA SYSTEMS

TESTING ANTENNA GROUND/CONNECTIONS

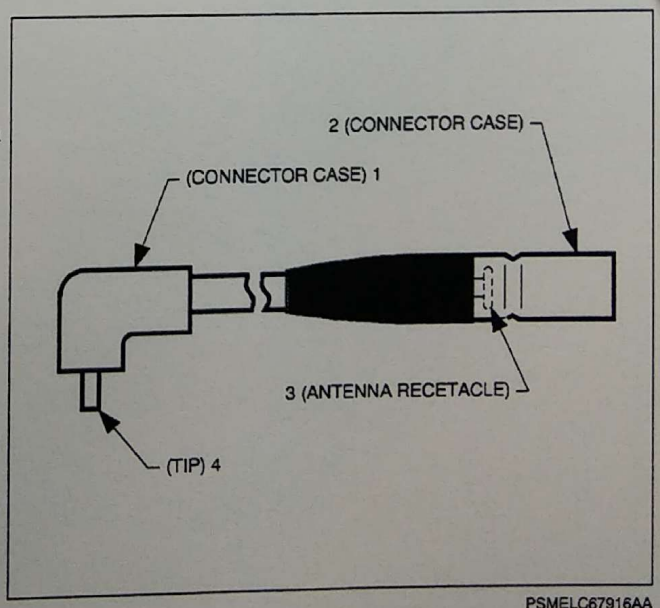
Poor connection in the antenna/lead-in system can result in seriously degraded radio performance. A poor ground can be a reason for excess noise on AM or erratic audio. Lead-in connectors must be clean and securely connected.

Possible ground loss or high-resistance ground points are:

- Lead-in cable connector at antenna (loose or internally corroded).
- Lead-in cable connector at radio (loose or internally corroded).
- Missing or loose ground bolt at right rear inner quarter.

CHECKING LEAD-IN CABLE

Usually symptoms of a broken center conductor of the lead-in cable will result in no AM and weak FM. In case of continued reception or noise complaints, always check the lead-in with an ohmmeter. The chart and illustration show readings which should be obtained. When checking resistance, wiggle the lead-in tip and cable. If the readings shown are not obtained, the lead-in should be replaced.



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MEASURE RESISTANCE WITH DIGITAL VOLT-OHMMETER.
(LEAD IN CABLE DIAGNOSIS)

PROBES ON	INDICATION (OHMS)*
1 AND 2	LESS THAN 0.3**
3 AND 4	LESS THAN 2.5**
1 AND 3	INFINITE
1 AND 4	INFINITE
2 AND 3	INFINITE
2 AND 4	INFINITE

* WHILE MEASURING, WIGGLE LEAD-IN TIP AND CABLE; INDICATION SHOULD NOT VARY.

** WHEN TAKING THESE READING BE SURE TO ZERO METER LEADS OR MISDIAGNOSIS MAY OCCUR.

USING A TEST ANTENNA

Disconnect antenna lead-in at back of radio and plug a test antenna into radio. Make sure test antenna base is grounded to the vehicle chassis and keep hands off the antenna. Check radio reception in an area away from electrical interferences such as tall buildings, metal structures, power lines, fluorescent lighting, and power tools. Tune to high and low ends of the dial on both AM and FM, checking weak and strong station reception.

If reception is okay, a problem may exist with the antenna and/or its lead-in cable. Be aware that most antennas generally provide better reception than film antennas. Compare reception to another vehicle before replacing antenna. If reception is still poor, refer to diagnosis in this section.

TAPE PLAYER WILL NOT WORK

Check for obstruction behind the tape door. If no obstruction is found, insert a good tape and check the operation. If the tape player continues not to work, remove the radio assembly for repair and refer to the appropriate trouble tree in this section.

TAPES SOUND WEAK OR NOISY

Clean the head using the procedure below. After cleaning insert a good tape and check the operation. If the tape sound is still weak and noisy, remove the radio assembly for repair.

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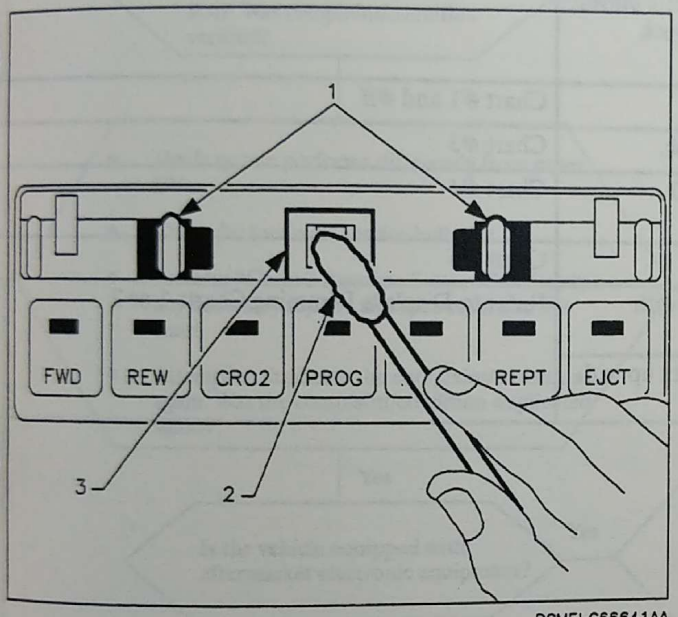
TAPE HEAD AND CAPSTAN CLEANING

There are two parts that are cleaned on a tape player: the head and the capstan. Since they can be reached through the tape door, do not remove the radio.This service should be performed every 100 hours of operation.

To clean the head and capstan, use a cotton swab dipped in ordinary rubbing alcohol, or use a cleaning cassette.

Do not contact the tape head with magnetized tools. If the head becomes magnetized, cassettes played will be degraded. No service is performed on the tapes and warranty of tapes is handled by the cassette manufacturer, not by the retailer. Any test tape used by the retailer should be stored in its container to keep the tape clean.

Store cassettes away from extreme heat or direct sunlight. When leaving the vehicle, cassettes may be left in auto-reverse tape players, as the head retracts to prevent damage when off.



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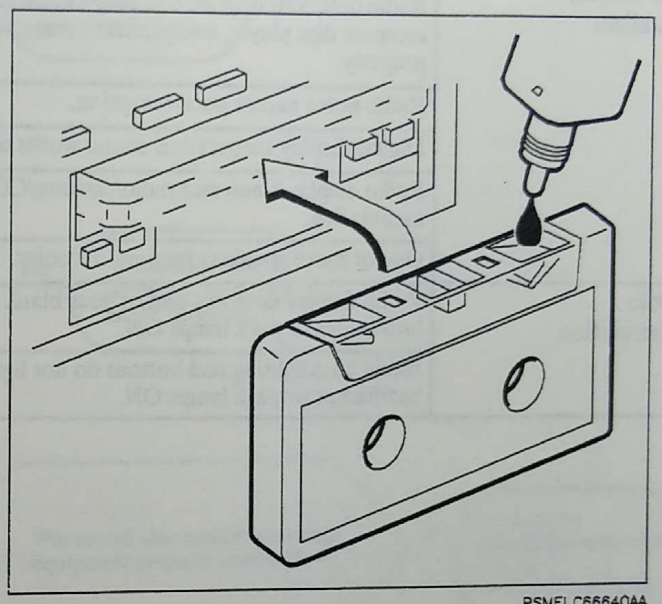
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SYSTEM DIAGNOSIS

Determine type of audio complaint. Try to duplicate condition (listen to AM or FM, start vehicle, put in a good CD or cassette, test switches, etc.) Verify radio system operation per information in this section.

Follow diagnosis given for your symptom in Symptom Table below.

SYMPTOM TABLE

SYMPTOM		FOR DIAGNOSIS
Radio/Clock/ Cassette Player/ Compact Disc Player/ Equalizer	Radio display forms incomplete numbers or letters.	Refer to hints under diagnosis. If condition is not resolved, send radio to an authorized AC-Delco repair station.
	Radio plays, however, one or more radio controls do not operate.	
	Radio functions operate correctly but cassette player, compact disc player, or equalizer do not work properly.	
	Radio noise and/or poor reception.	Chart #1 and #2
	Digital display inoperative, sound works ok.	Chart #3
	Radio display blank and radio/cassette/CD inoperative.	Chart #4
	One or more speakers inoperative/noisy.	Chart #5
Radio Illumination	Radio display does not dim or goes blank with headlamps or park lamps ON.	Refer to Displays Dimming Charts 1 or 2
	Radio backlighting and buttons do not light up with headlamps or park lamps ON.	

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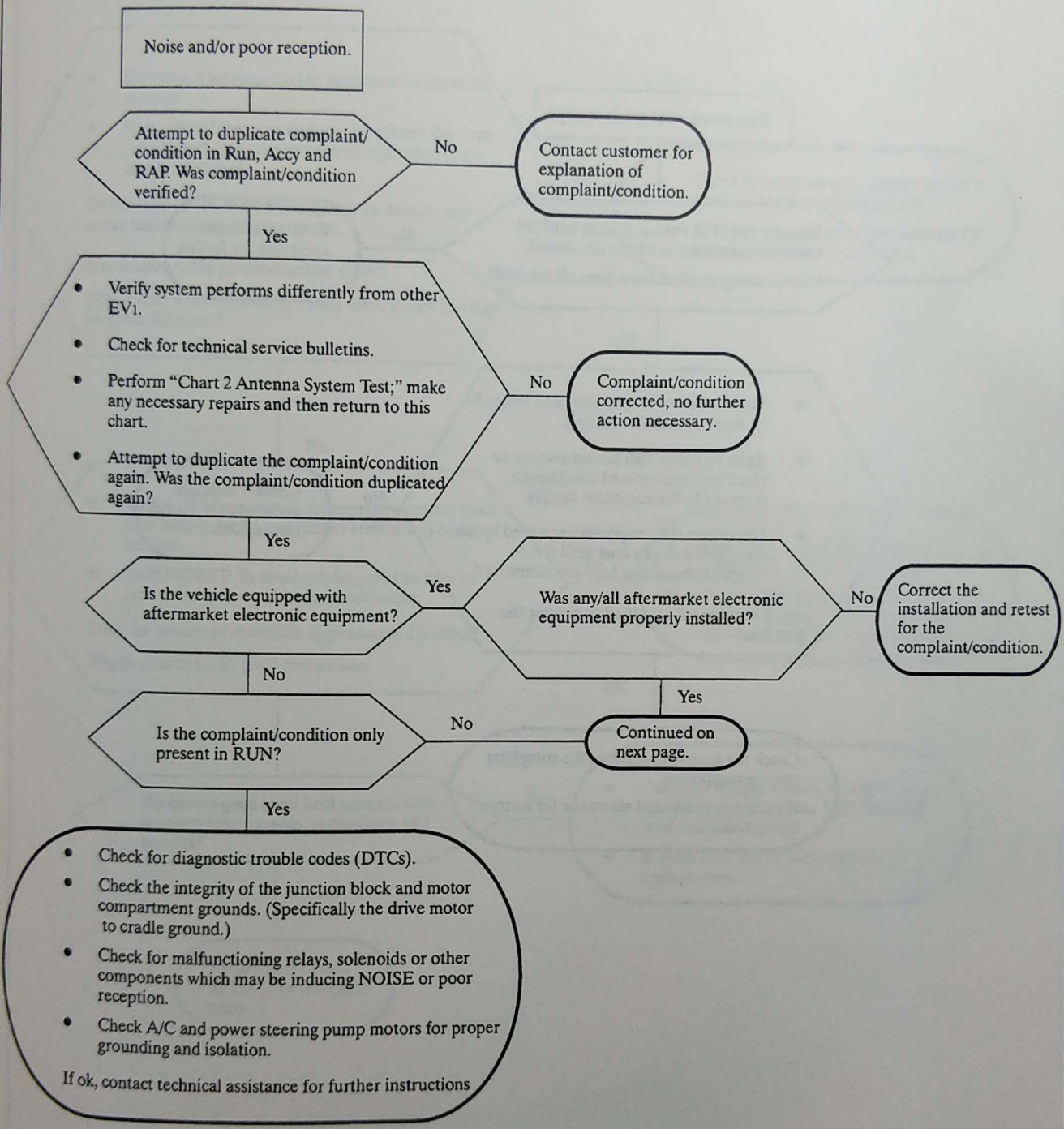
RADIO NOISE AND/OR POOR RECEPTION

CHART 1

Important : To avoid misdiagnosis check for stored diagnostic trouble codes (DTCs) and diagnose those first.



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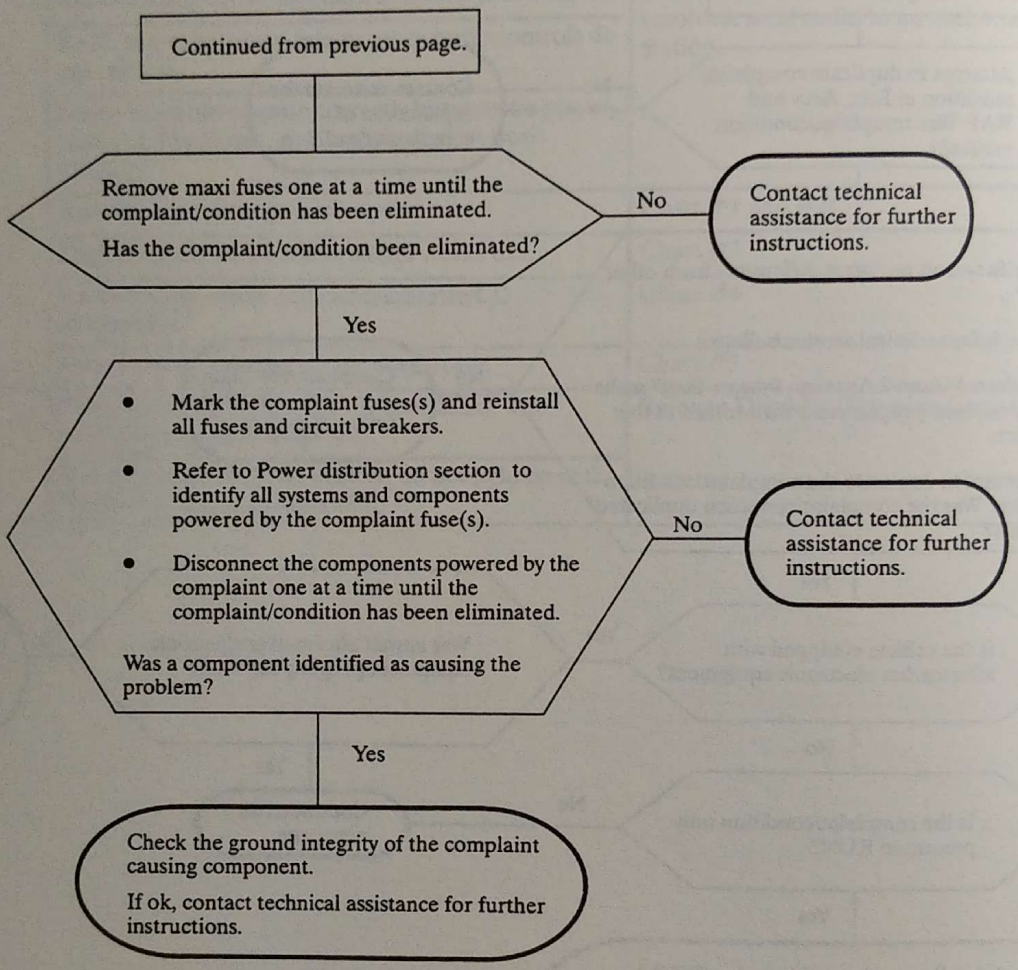
RADIO NOISE AND/OR POOR RECEPTION – (CONTINUED)

CHART 1



ANTENNA SYSTEM TEST

CHART 2

- Disconnect antenna lead-in connector at the radio receiver.
- With a DVM measure resistance between the coax (outer conductor) connector and a junction block case ground stud.

IMPORTANT: To avoid misdiagnosis be sure to zero meter before taking measurements.

Is resistance value greater than 0.5 ohms?

Wiggle coax while measuring - does value intermittently go above 0.5 ohms?

Yes

- Check the antenna coax ground bolt for a good connection to body ground.
- Check the coaxial cable interconnects for a poor connection or corrosion.

No

- With a DVM measure resistance between the radio coax lead-in connector (center conductor) and the antenna.
- IMPORTANT: To avoid misdiagnosis be sure to zero meter before taking measurements.

Does the measured resistance approximate 2.0 ohms?

Wiggle coax to verify good connection.

No

- Check the coaxial cable interconnects for a poor connection or corrosion.
- Replace the antenna coaxial circuit antenna as necessary and return to the noise and/or poor reception chart.

Yes

Try known good hand held antenna with separate coax to radio. Is condition still present?

No

- Compare reception to another EV1 since reception varies between hand-held and roof antennas.
- If other EV1 has better reception, replace antenna.

Yes

Return to the noise and/or poor reception chart.

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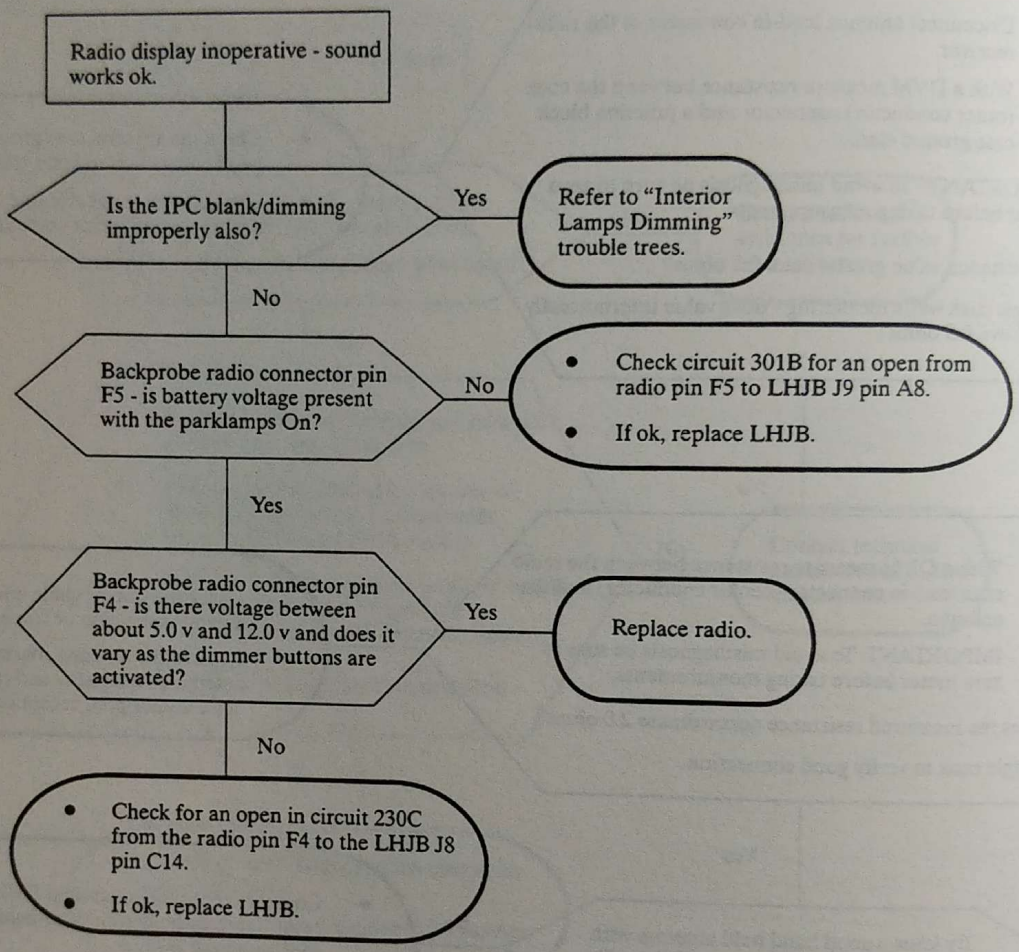
RADIO DISPLAY INOPERATIVE - SOUND WORKS OK

CHART 3



RADIO DISPLAY BLANK AND RADIO/CASSETTE/CD INOPERATIVE

CHART 4

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Radio display blank and radio/cassette/cd inoperative.

Backprobe radio connector. Is there over 0.2 volts on pin E16 to ground?

Yes

- Check for open in circuit 1051 from radio pin E16 to RHJB J9 pin C14.
- If ok, replace RHJB.

No

Backprobing radio connector - is there battery voltage on pin F1?

No

Do power door locks work?

No

Refer to "Power Door Locks Inoperative" diagnosis.

Yes

Yes

Is there battery voltage at RHJB J8 pin A11?

Yes

Repair open in circuit 2040 between RHJB J8 pin A11 and radio pin F1.

No

Using amp probe at RHJB J8 pin A11 is there over 20mA?

No

Replace RHJB.

Yes

- Check for short to ground on circuit 2040 between RHJB J8 pin A11 and radio pin F1.
- If circuit is ok, replace radio.

With the vehicle in Run mode, is there battery voltage on radio pin F2 (backprobed)?

Yes

Replace radio.

No

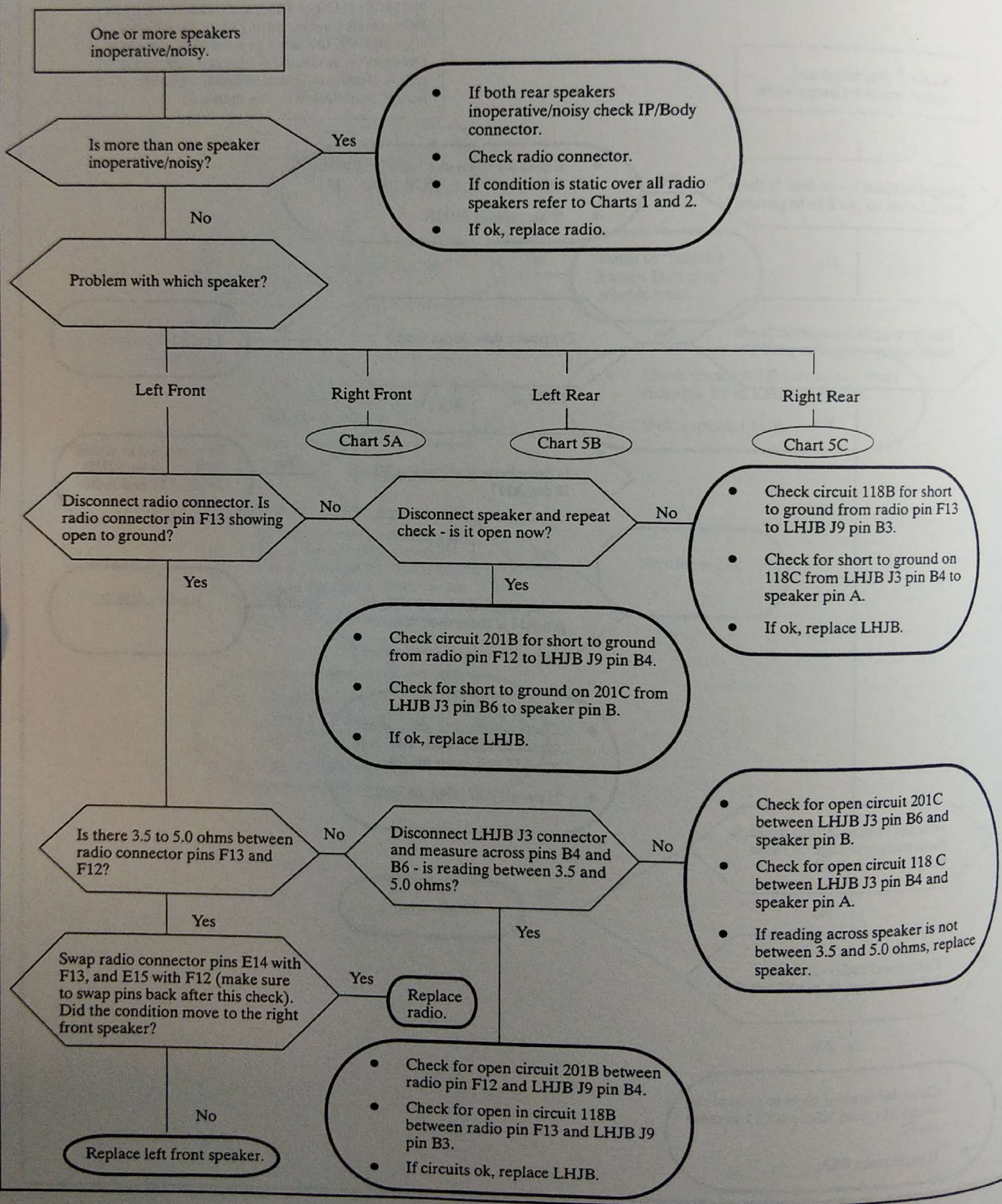
Disconnect radio - is there battery voltage on pin F2 now?

No

- Check for open or short to ground on circuit 314 from RSA pin C11 to radio pin F2.
- If ok, replace RSA.

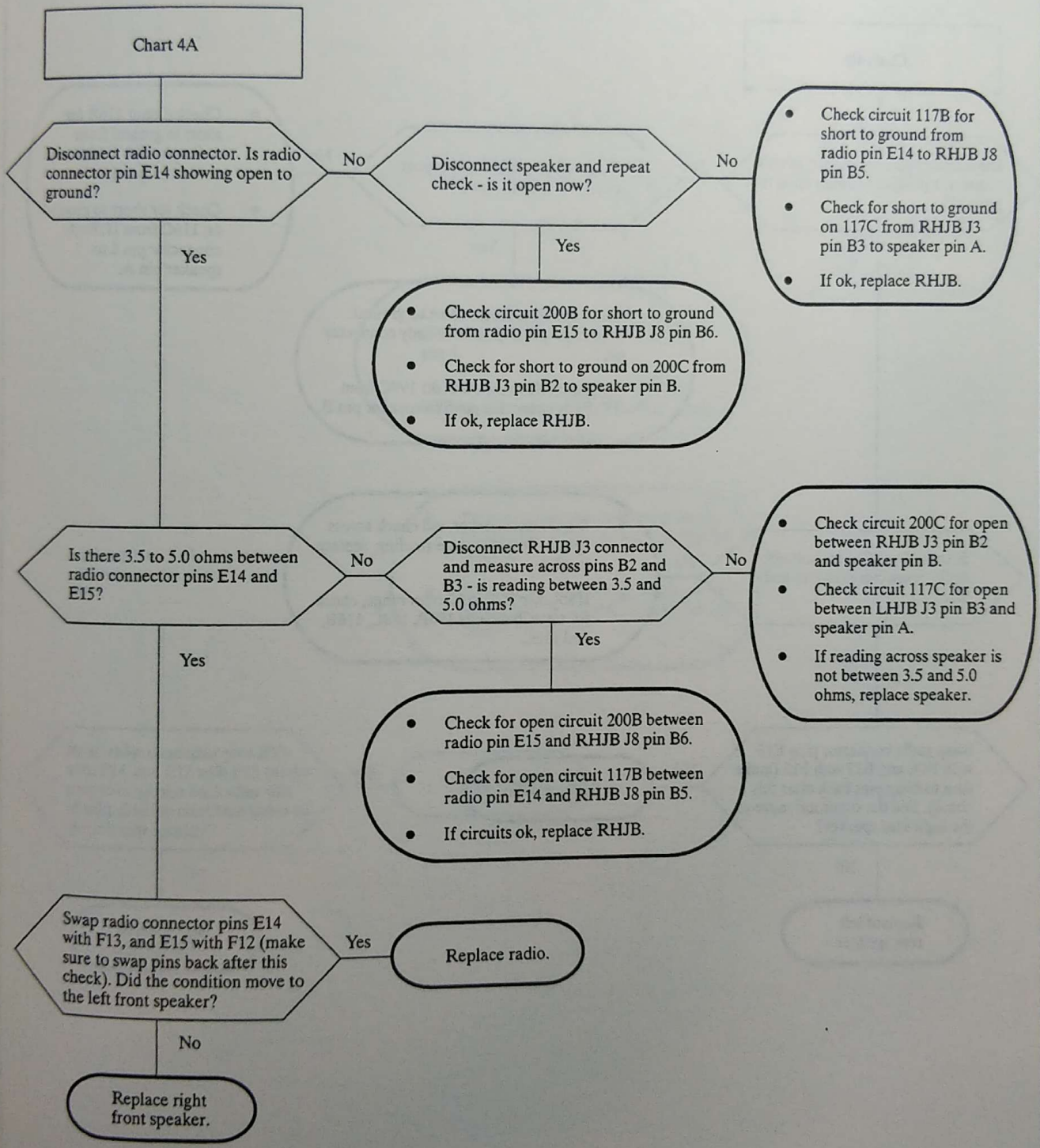
ONE OR MORE SPEAKERS INOPERATIVE/NOISY

CHART 5



ONE OR MORE SPEAKERS INOPERATIVE/NOISY (CONTINUED)

CHART 5A



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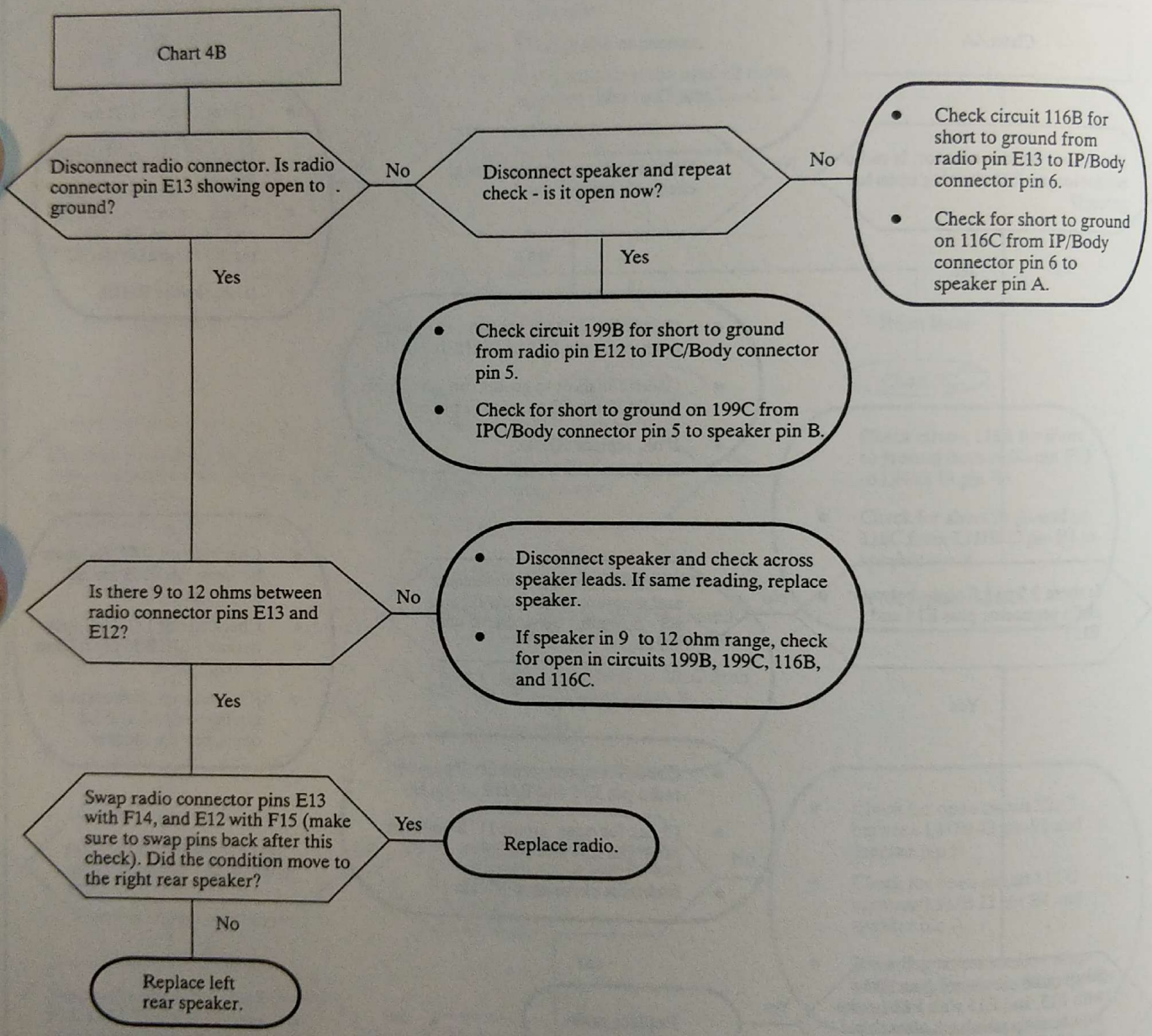
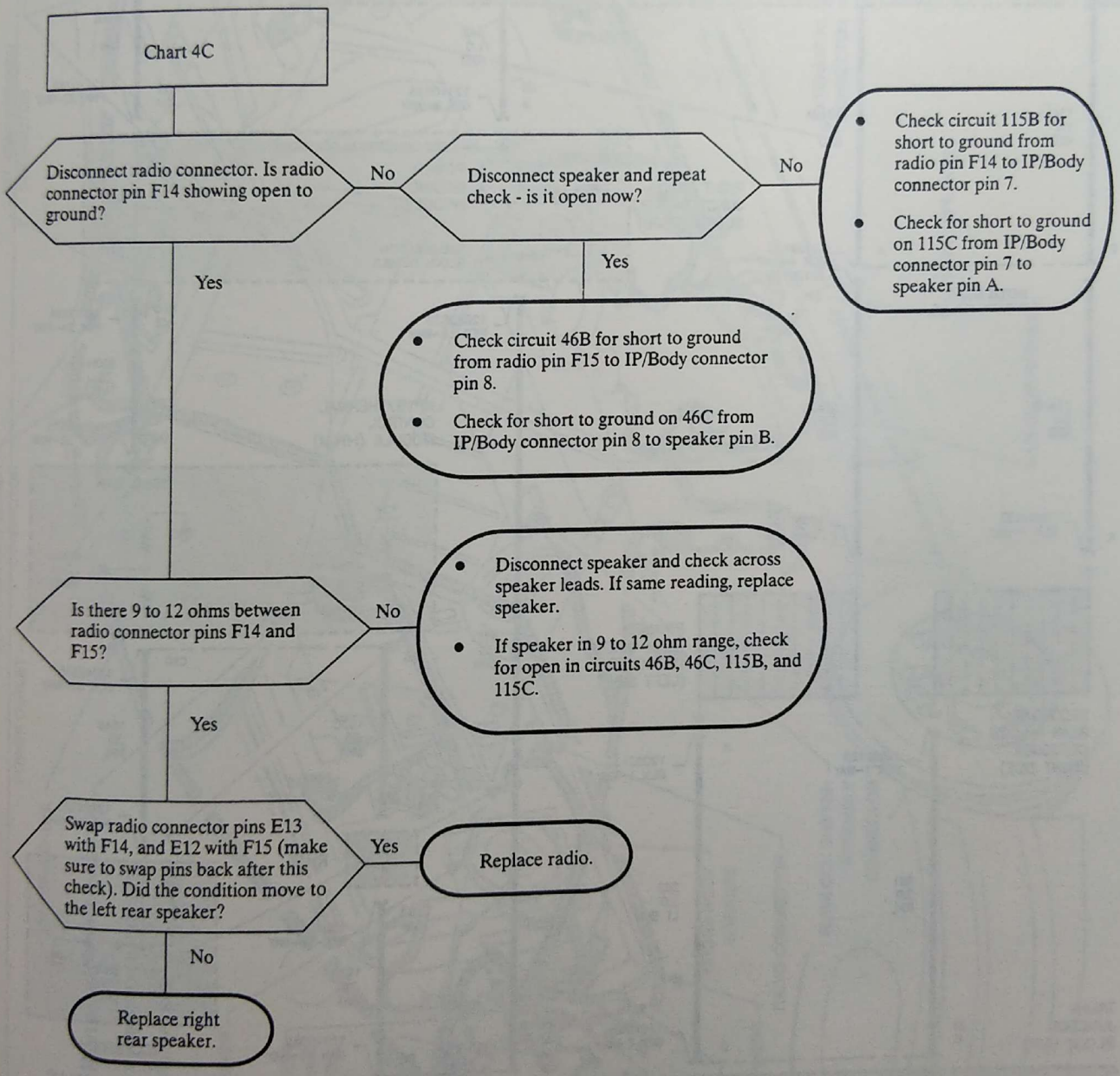
ONE OR MORE SPEAKERS INOPERATIVE/NOISY (CONTINUED)

CHART 5B

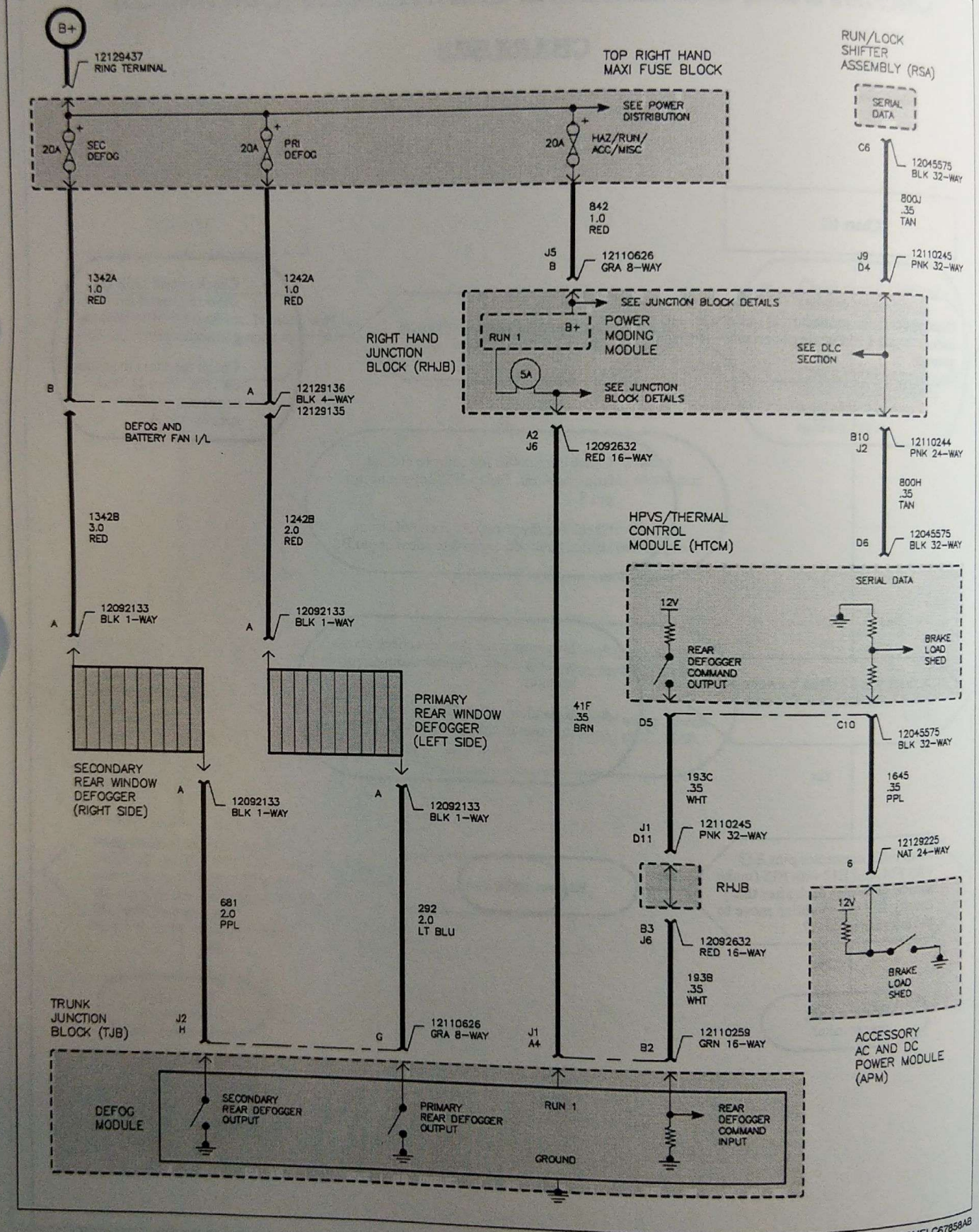


ONE OR MORE SPEAKERS INOPERATIVE/NOISY (CONTINUED)

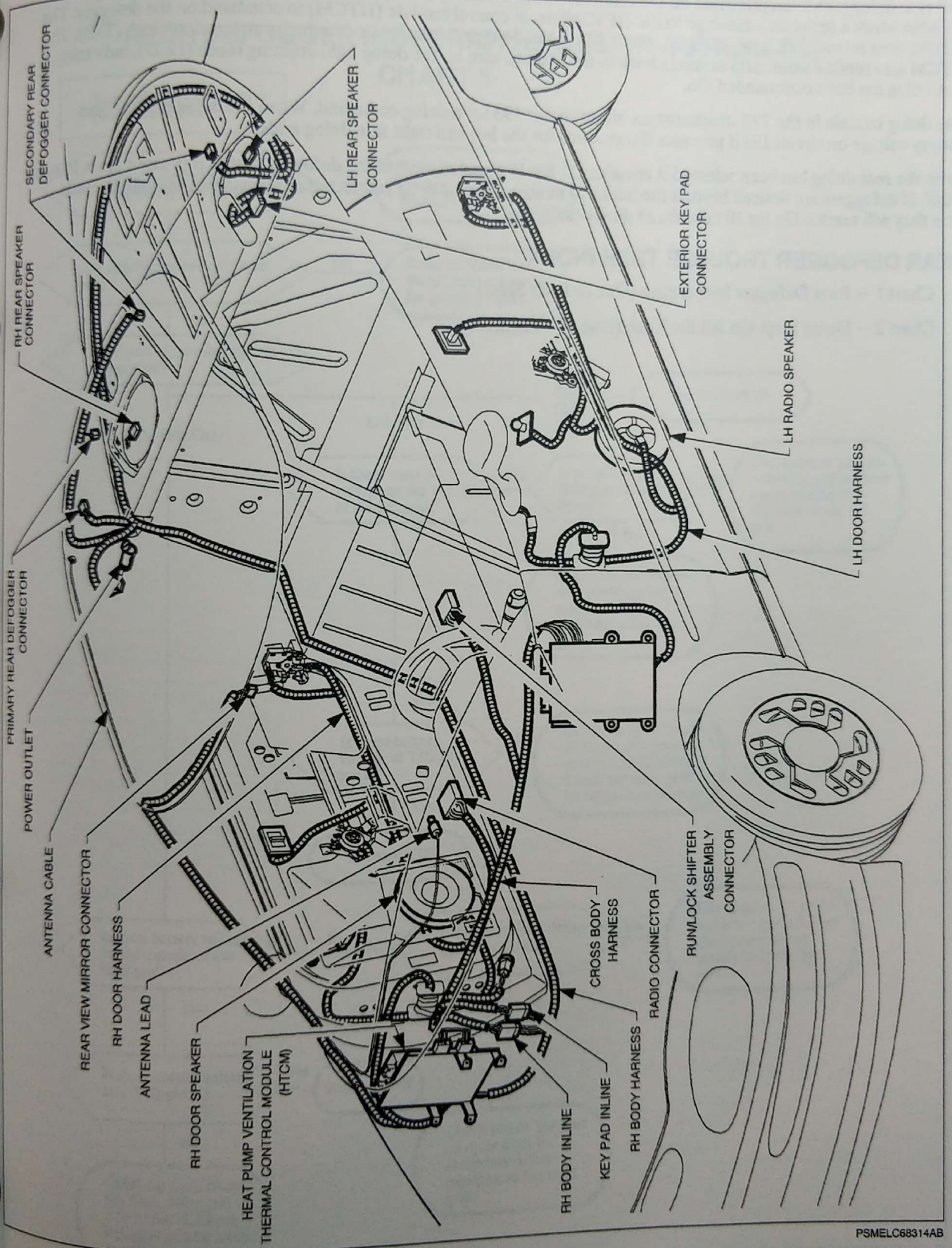
CHART 5C



REAR DEFOGGER



REAR DEFOGGER COMPONENT LOCATION VIEW



REAR DEFOGGER

The rear defogger button is located on the run/lock shifter assembly (RSA). When the rear defogger button is pressed, the RSA sends a serial data message to the HPVS/thermal control module (HTCM) to command on the defogger. The HTCM then provides battery power on circuit 193 to the defog module, located in the trunk junction block (TJB). The HTCM also sends a serial data message back to the RSA to turn on the defog light emitting diode (LED), indicating that defog has been commanded On.

The defog module in the TJB constantly monitors circuit 193 for a defog command. When the defog module sees battery voltage on circuit 193 it provides the grounds for the left and right side defog grids.

Once the rear defog has been selected it remains On for 10 minutes or until the defogger button is pressed again to turn it Off. If defoggers are desired beyond the initial 10 minutes, they may be reselected as many times as desired. Each time they will remain On for 10 minutes or until deselected.

REAR DEFOGGER TROUBLE TREE INDEX

- Chart 1 – Rear Defogger Inoperative (One or Both Sides)
- Chart 2 – Defog Stays On All the Time (One or Both Sides)

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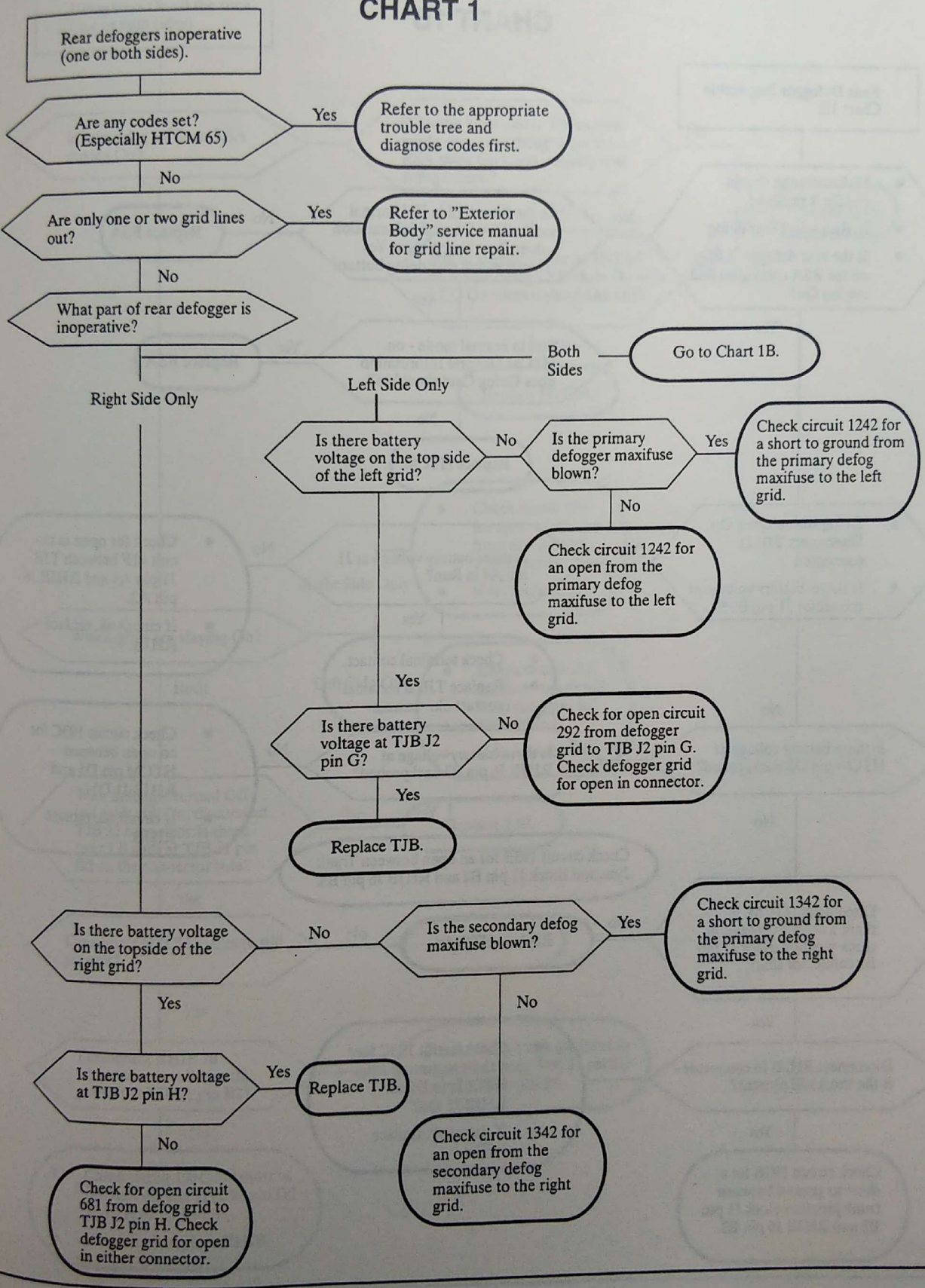
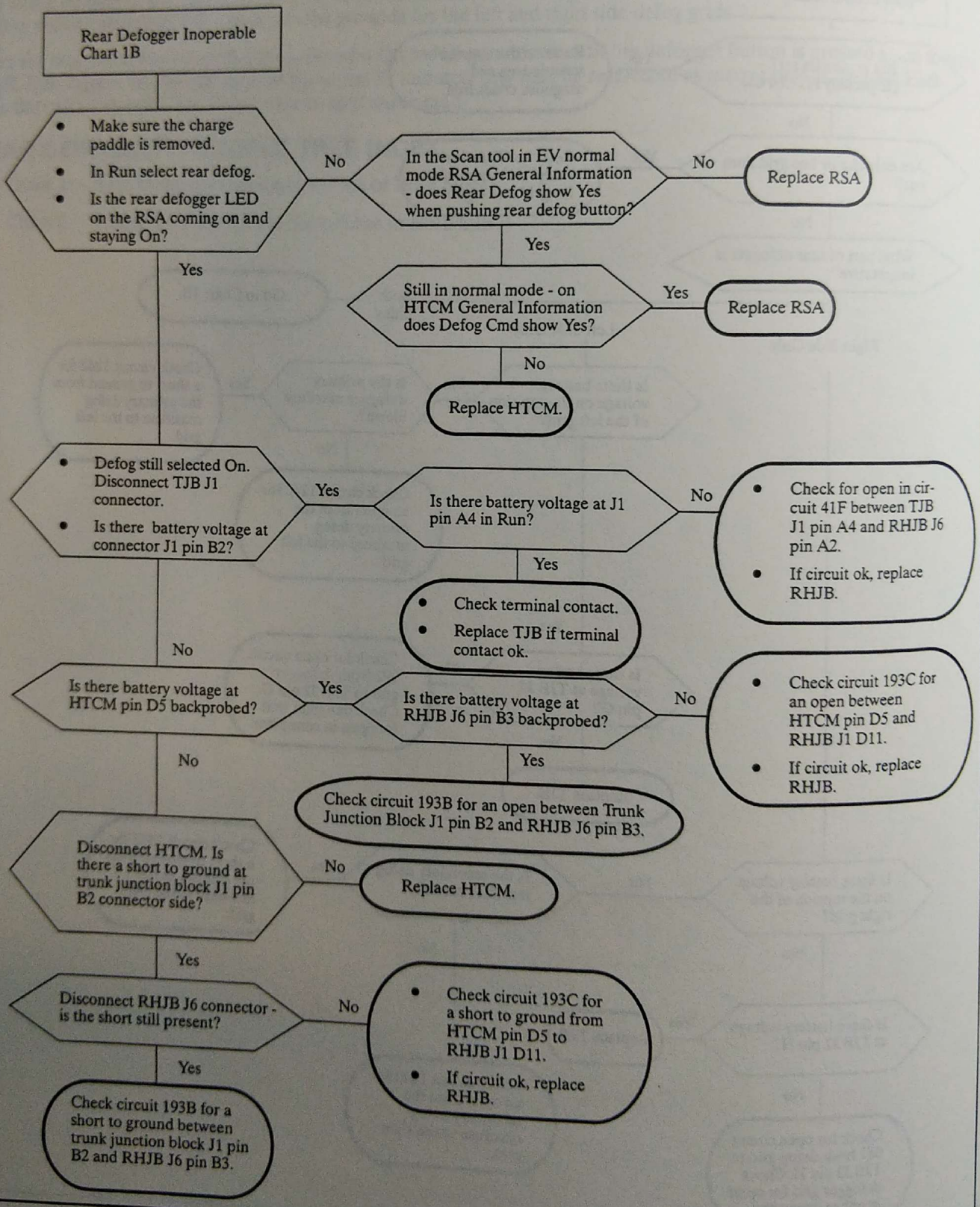
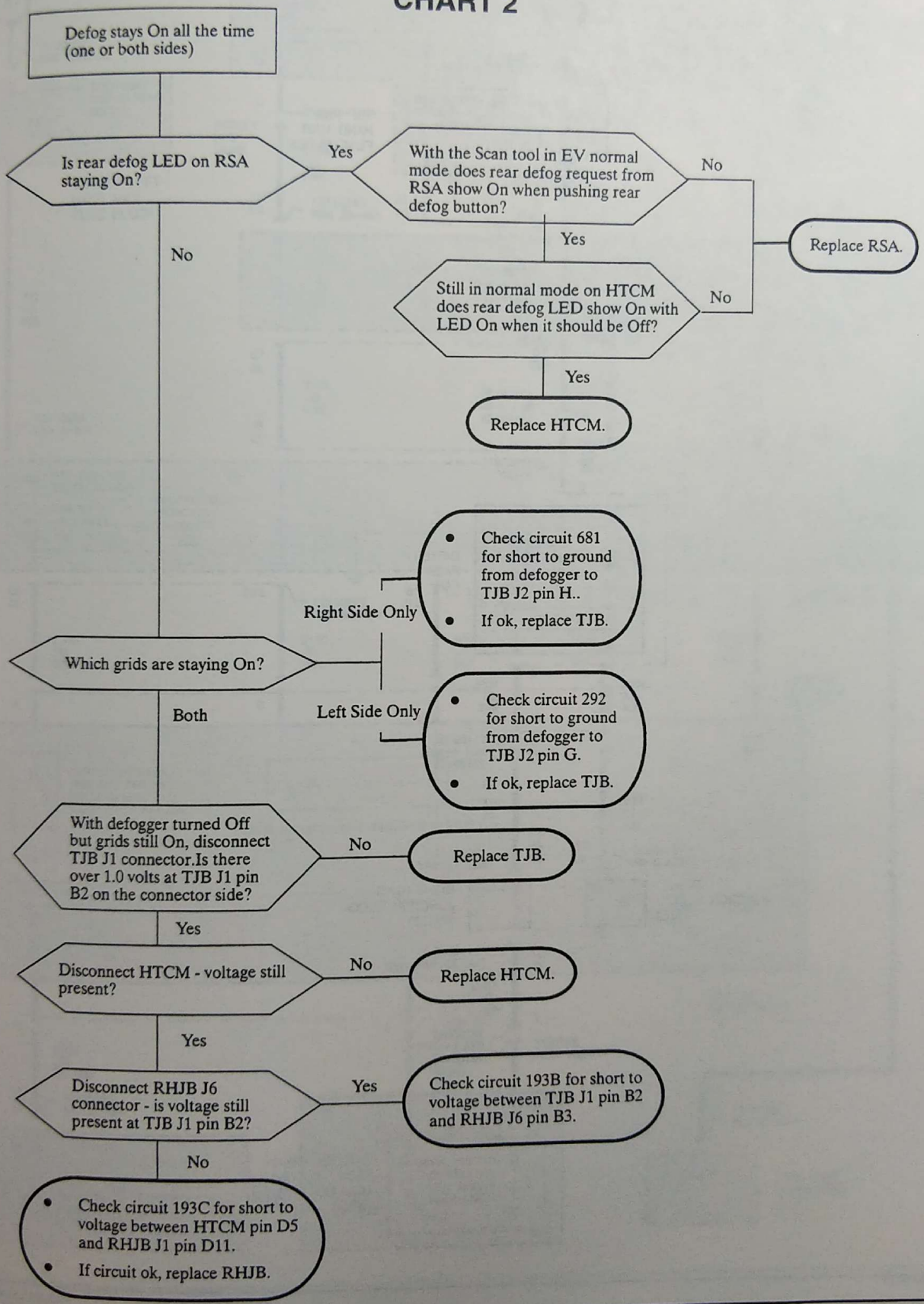
REAR DEFOGGER INOPERATIVE (ONE OR BOTH SIDES)
CHART 1



REAR DEFOGGER INOPERATIVE
CHART 1B



DEFOG STAYS ON ALL THE TIME (ONE OR BOTH SIDES) CHART 2



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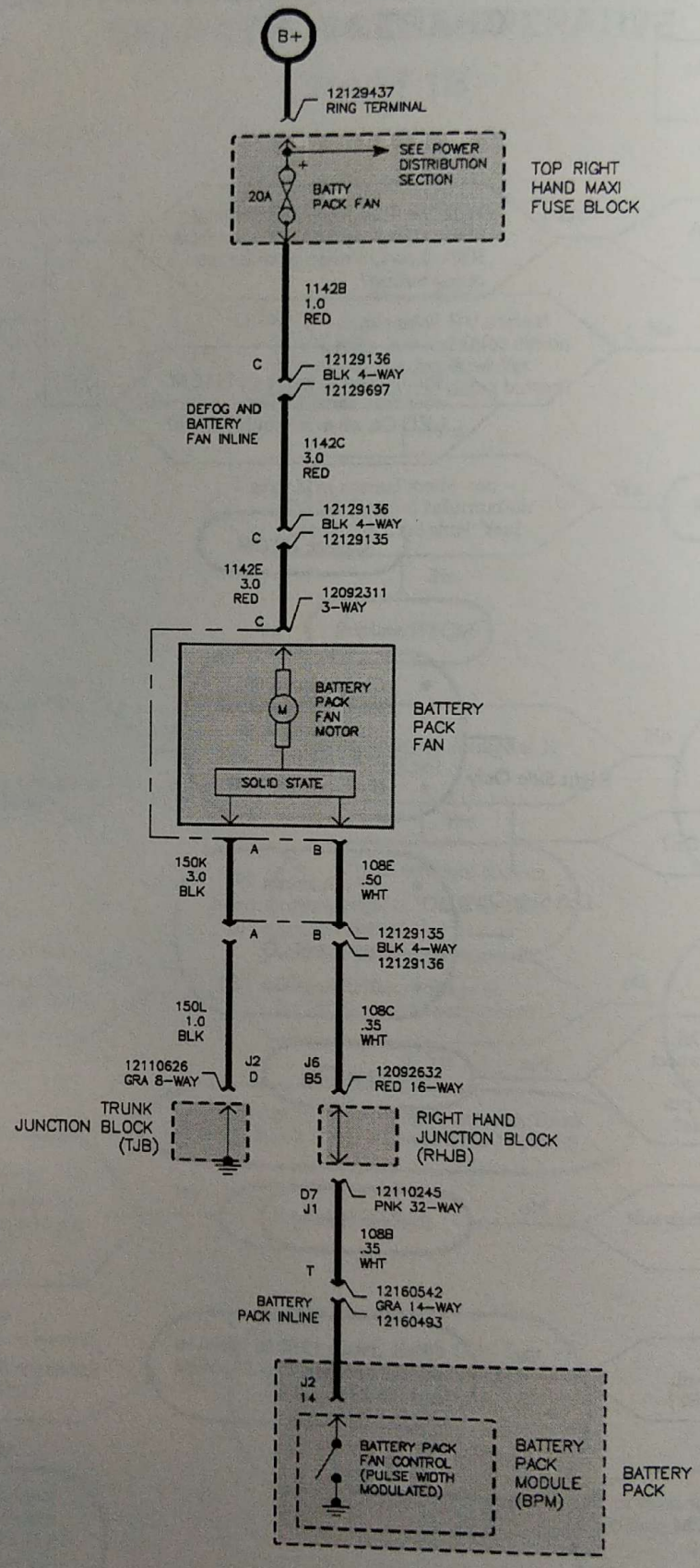
RECHARGING



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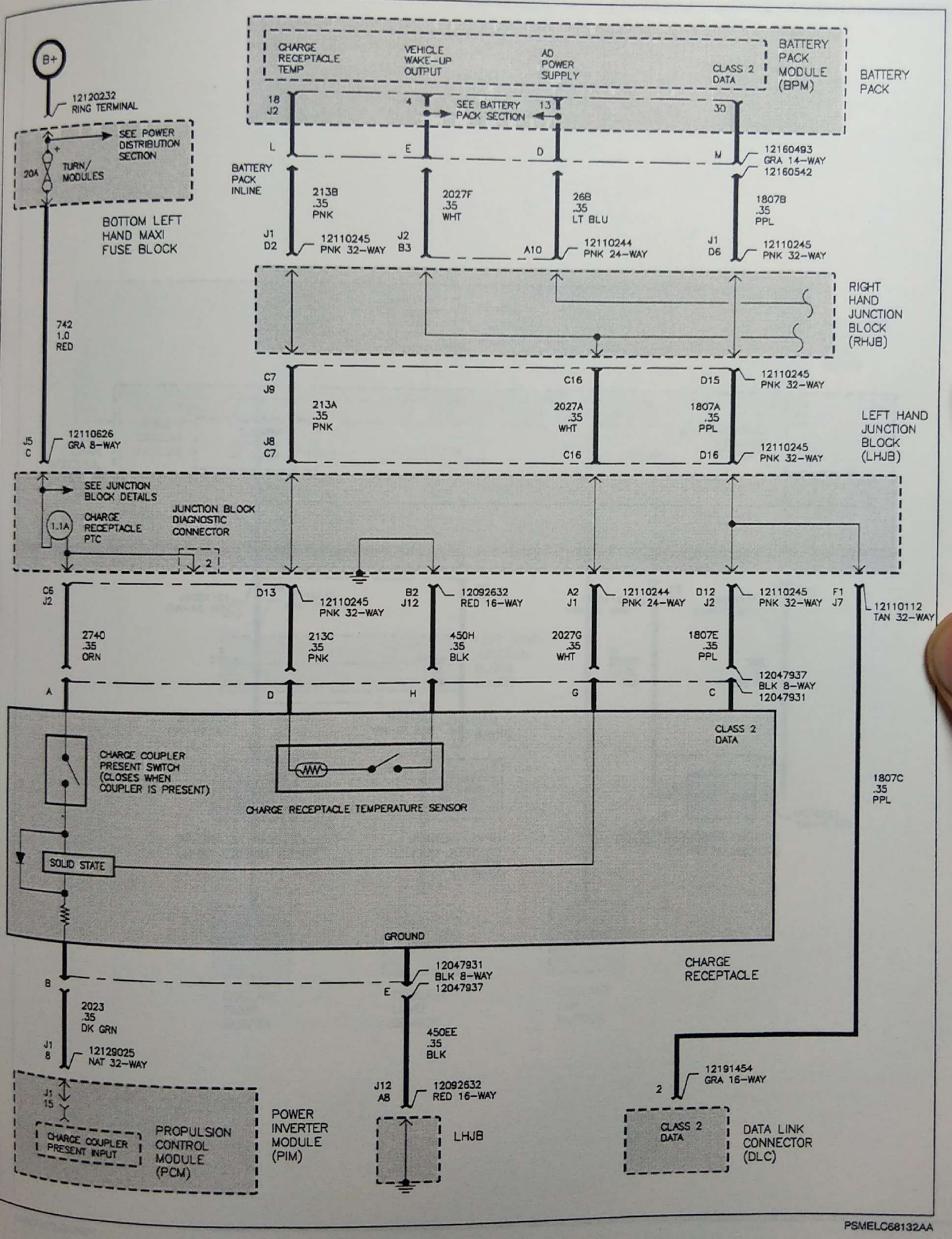
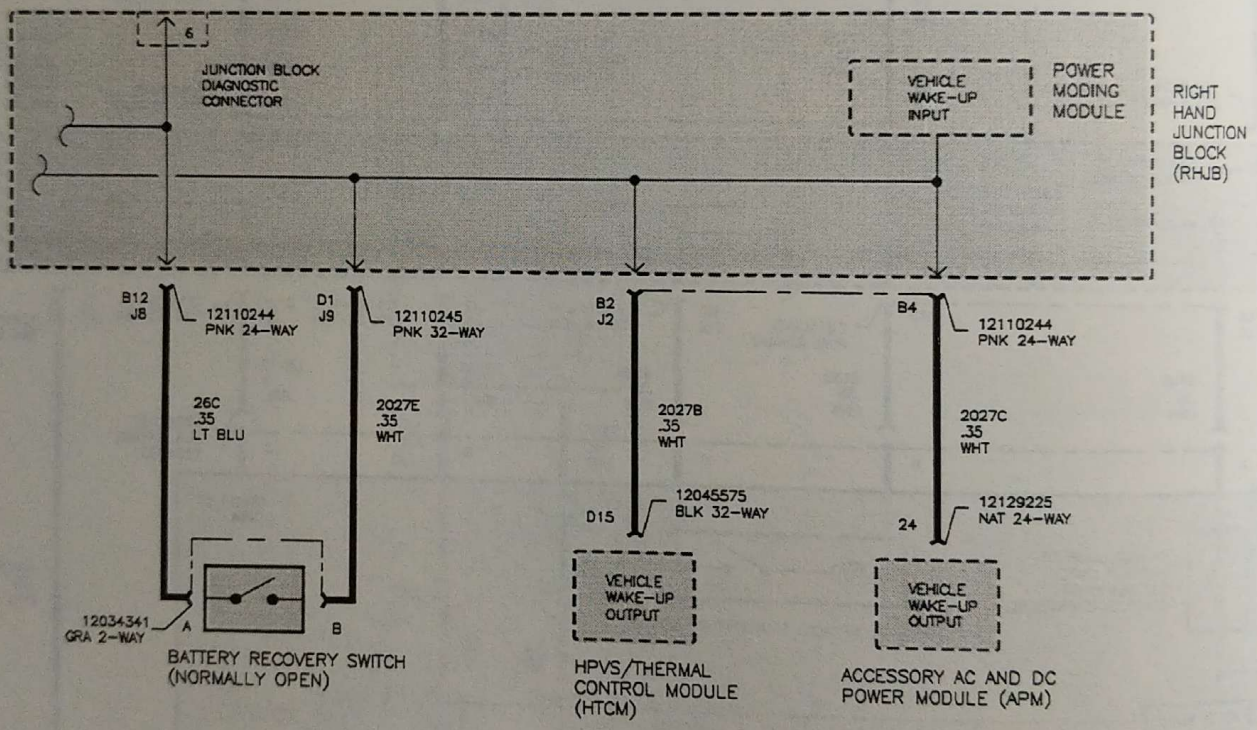

B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION SECTION
20A
TURN/ MODULES
BOTTOM LEFT HAND MAXI FUSE BLOCK
742
1.0
RED
C5
12110626
GRA 8-WAY
CHARGE RECEPTACLE TEMP
VEHICLE WAKE-UP OUTPUT
A0 POWER SUPPLY
CLASS 2 DATA
BATTERY PACK MODULE (BPM)
BATTERY PACK
18
J2
4
SEE BATTERY PACK SECTION
13
30
L
E
D
M
12160493
GRA 14-WAY
12160542
BATTERY PACK INLINE
213B
.35
PNK
2027F
.35
WHT
26B
.35
LT BLU
1807B
.35
PPL
J1
D2
12110245
PNK 32-WAY
J2
B3
A10
12110244
PNK 24-WAY
J1
D6
12110245
PNK 32-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
C7
J9
213A
.35
PNK
C16
2027A
.35
WHT
D15
1807A
.35
PPL
12110245
PNK 32-WAY
J8
C7
C16
D16
12110245
PNK 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
SEE JUNCTION BLOCK DETAILS
1.1A
CHARGE RECEPTACLE PTC
JUNCTION BLOCK DIAGNOSTIC CONNECTOR
2
C6
J2
D13
12110245
PNK 32-WAY
B2
J12
12092632
RED 16-WAY
A2
J1
12110244
PNK 24-WAY
D12
J2
12110245
PNK 32-WAY
F1
J7
12110112
TAN 32-WAY
2740
.35
ORN
213C
.35
PNK
450H
.35
BLK
2027G
.35
WHT
1807E
.35
PPL
A
D
H
G
C
12047937
BLK 8-WAY
12047931
CLASS 2 DATA
CHARGE COUPLER PRESENT SWITCH (CLOSES WHEN COUPLER IS PRESENT)
CHARGE RECEPTACLE TEMPERATURE SENSOR
1807C
.35
PPL
SOLID STATE
GROUND
B
E
12047931
BLK 8-WAY
12047937
CHARGE RECEPTACLE
2023
.35
DK GRN
450EE
.35
BLK
J1
8
12129025
NAT 32-WAY
J12
A8
12092632
RED 16-WAY
2
12191454
GRA 16-WAY
J1
15
CHARGE COUPLER PRESENT INPUT
PROPULSION CONTROL MODULE (PCM)
POWER INVERTER MODULE (PIM)
LHJB
CLASS 2 DATA
DATA LINK CONNECTOR (DLC)
PSMELC68132AA



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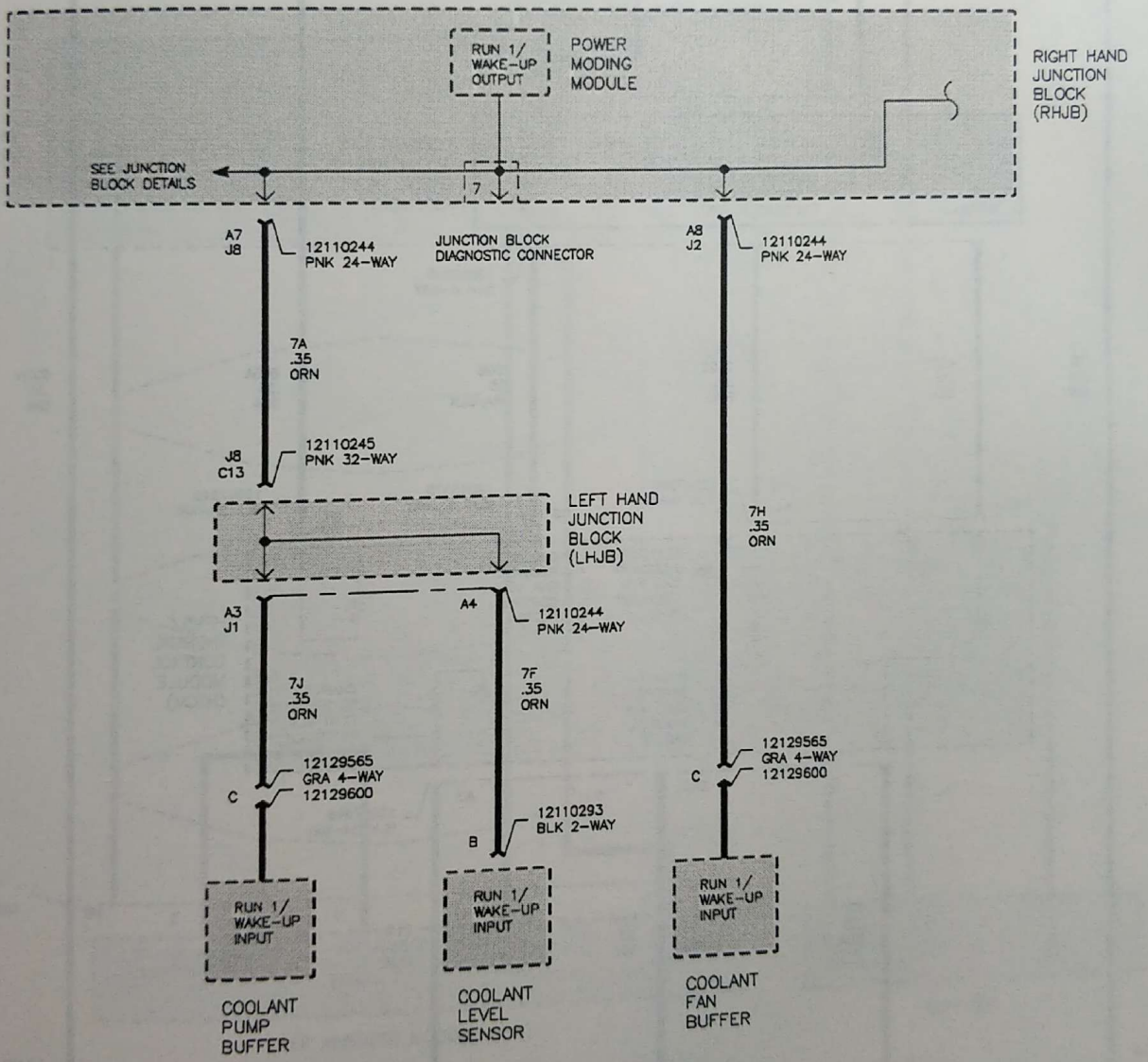

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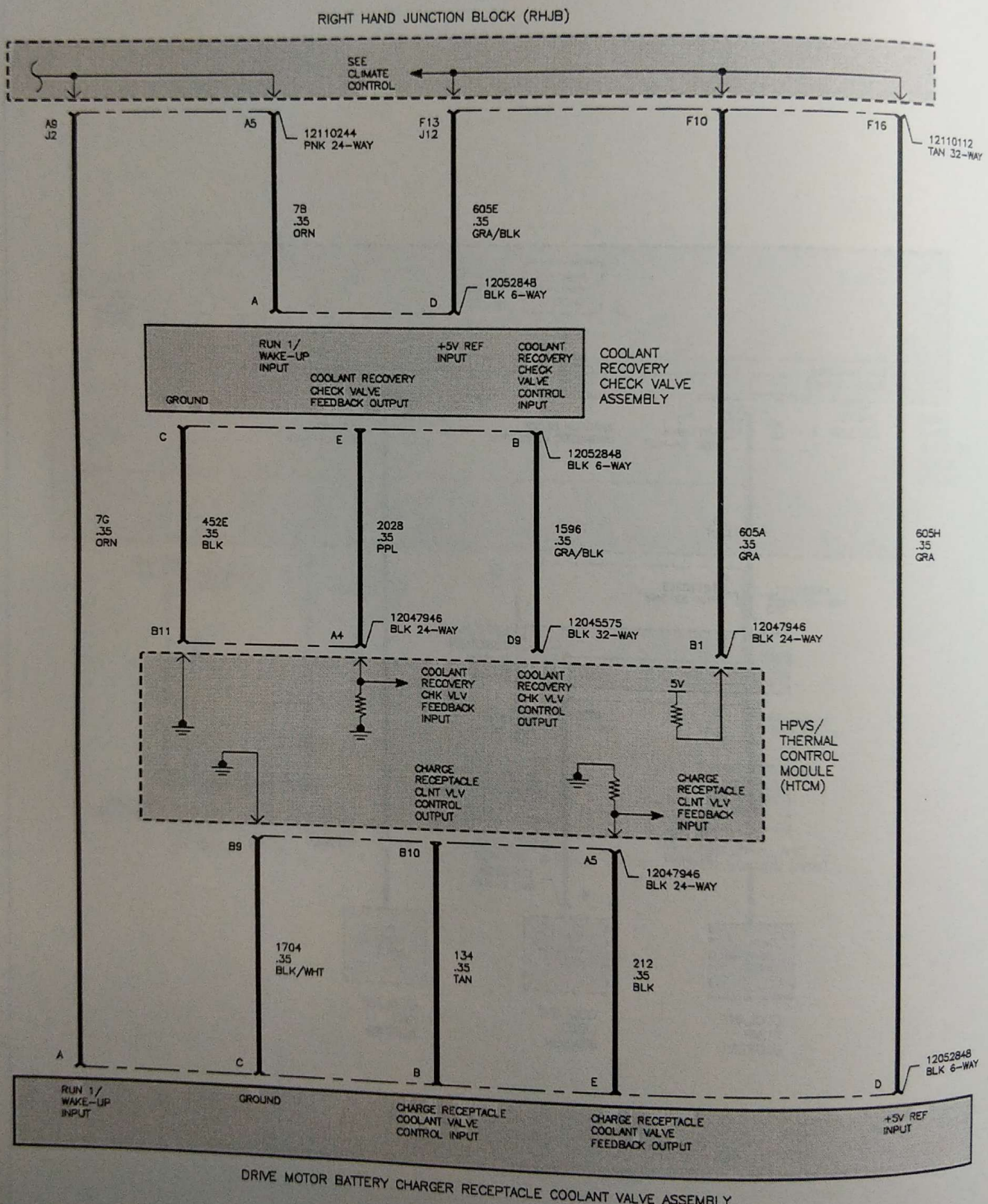
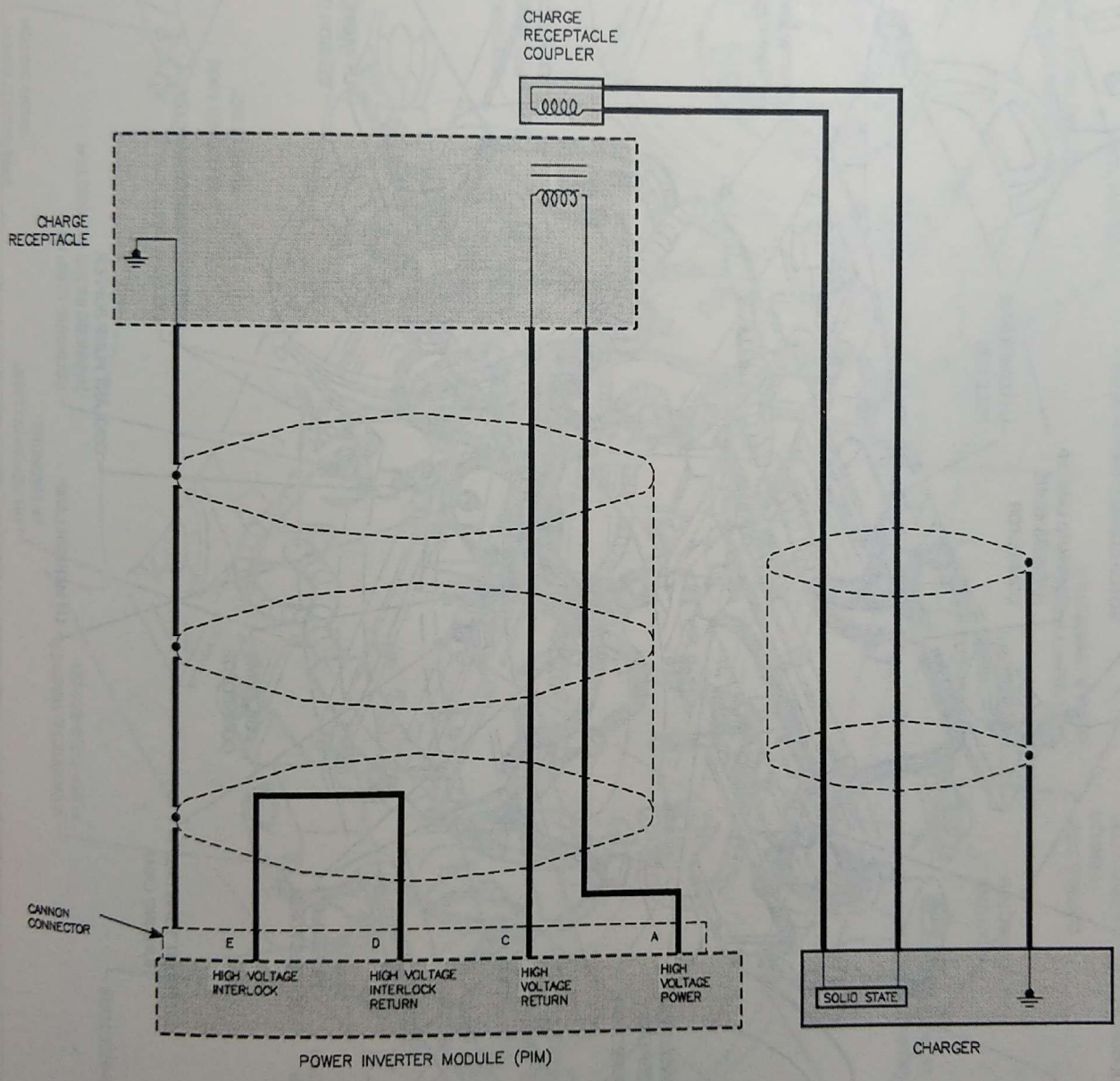
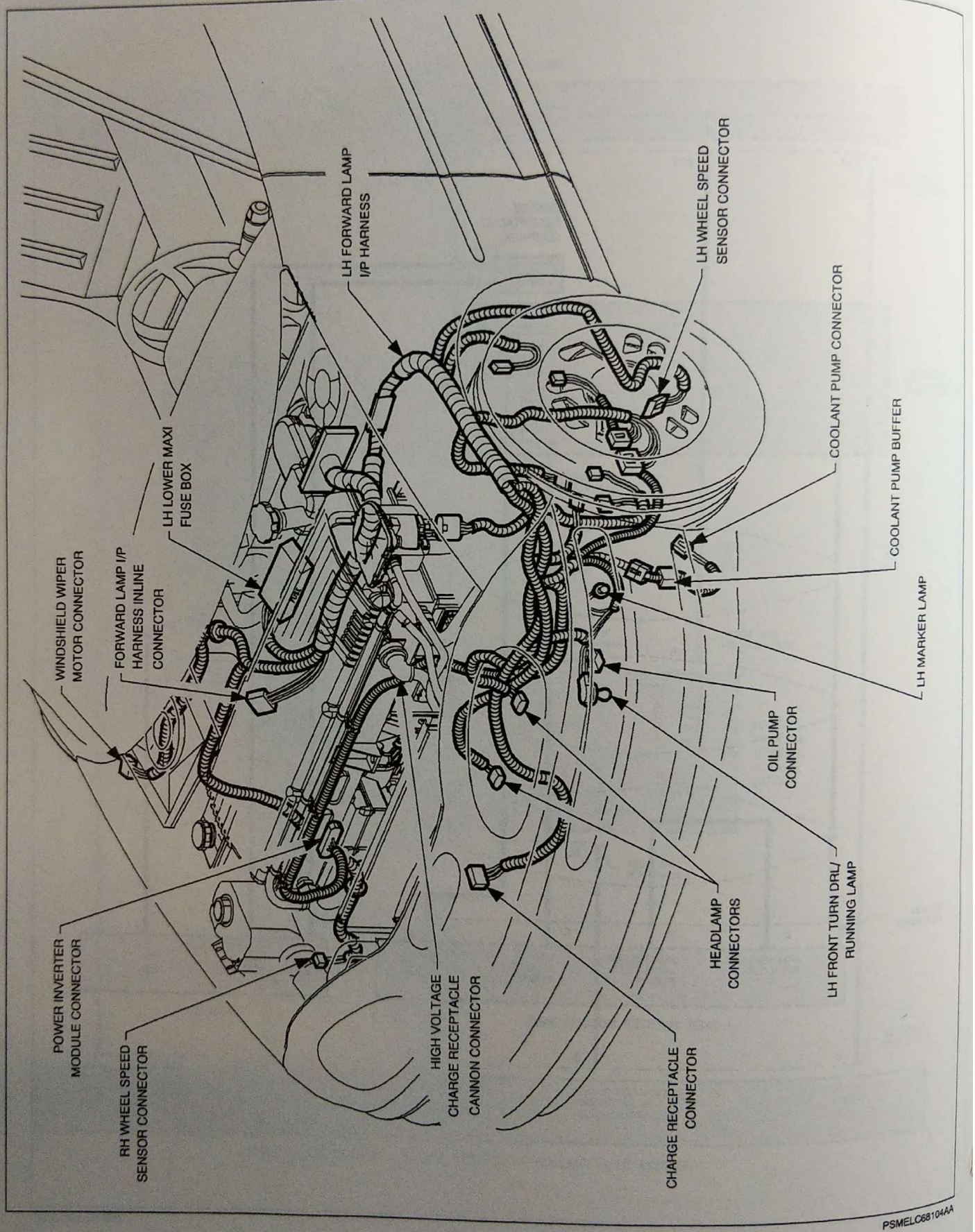

RIGHT HAND JUNCTION BLOCK (RHJB)
SEE CLIMATE CONTROL
A9 J2
A5
12110244 PNK 24-WAY
F13 J12
F10
F16
12110112 TAN 32-WAY
7B .35 ORN
605E .35 GRA/BLK
12052848 BLK 6-WAY
A
D
RUN 1/ WAKE-UP INPUT
+5V REF INPUT
COOLANT RECOVERY CHECK VALVE CONTROL INPUT
COOLANT RECOVERY CHECK VALVE FEEDBACK OUTPUT
GROUND
COOLANT RECOVERY CHECK VALVE ASSEMBLY
C
E
B
12052848 BLK 6-WAY
7G .35 ORN
452E .35 BLK
2028 .35 PPL
1596 .35 GRA/BLK
605A .35 GRA
605H .35 GRA
B11
A4
D9
B1
12047946 BLK 24-WAY
12045575 BLK 32-WAY
COOLANT RECOVERY CHK VLV FEEDBACK INPUT
COOLANT RECOVERY CHK VLV CONTROL OUTPUT
5V
CHARGE RECEPTACLE CLNT VLV CONTROL OUTPUT
CHARGE RECEPTACLE CLNT VLV FEEDBACK INPUT
HPVS/ THERMAL CONTROL MODULE (HTCM)
B9
B10
A5
1704 .35 BLK/WHT
134 .35 TAN
212 .35 BLK
A
C
B
E
D
RUN 1/ WAKE-UP INPUT
GROUND
CHARGE RECEPTACLE COOLANT VALVE CONTROL INPUT
CHARGE RECEPTACLE COOLANT VALVE FEEDBACK OUTPUT
+5V REF INPUT
DRIVE MOTOR BATTERY CHARGER RECEPTACLE COOLANT VALVE ASSEMBLY
PSMELC68135AA



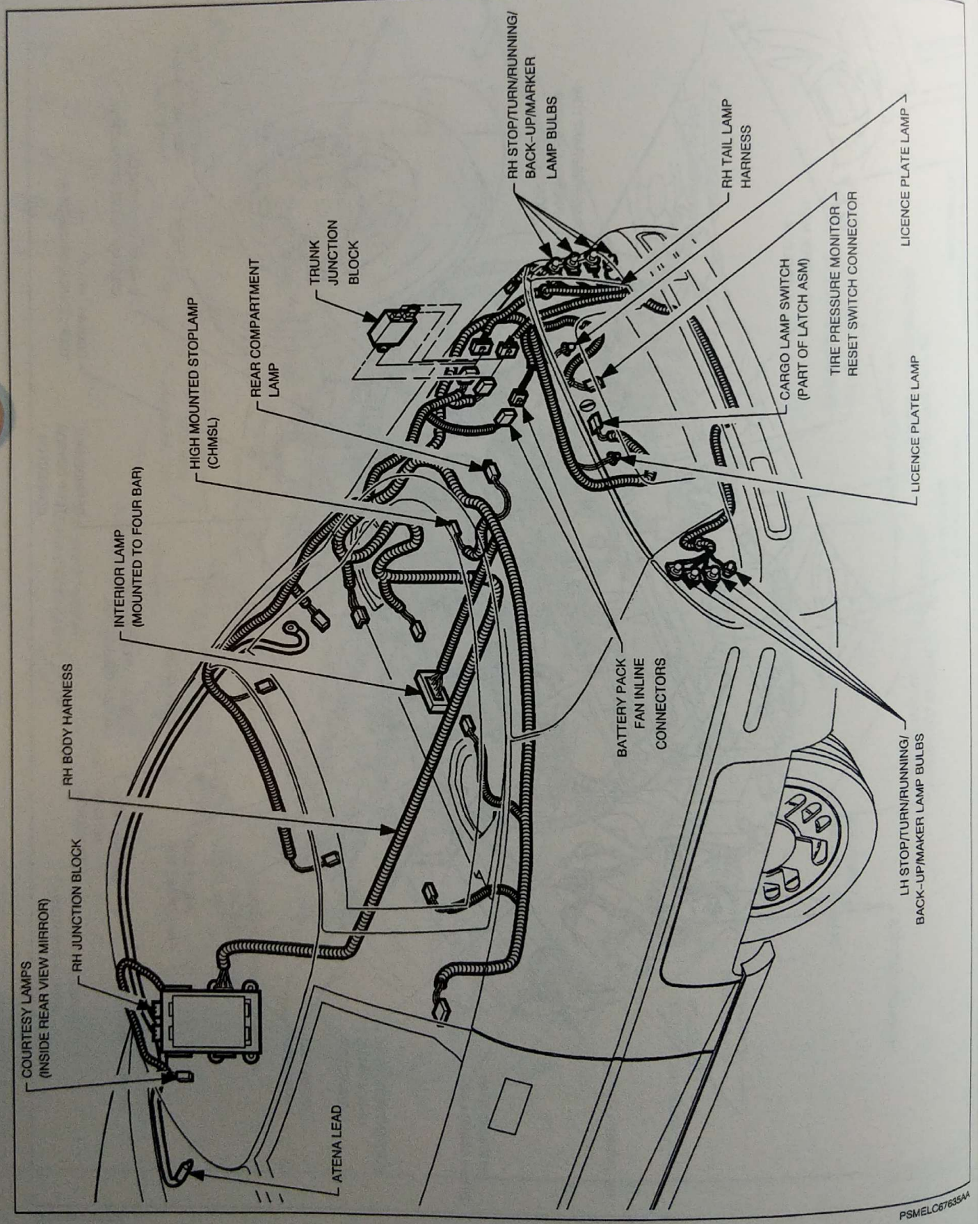
PSMELC68136AA

RECHARGING COMPONENT LOCATION VIEWS



RECHARGING COMPONENT LOCATION VIEWS (CONTINUED)

RECHARGING COMPONENT LOCATION VIEWS (CONTINUED)



NOTES

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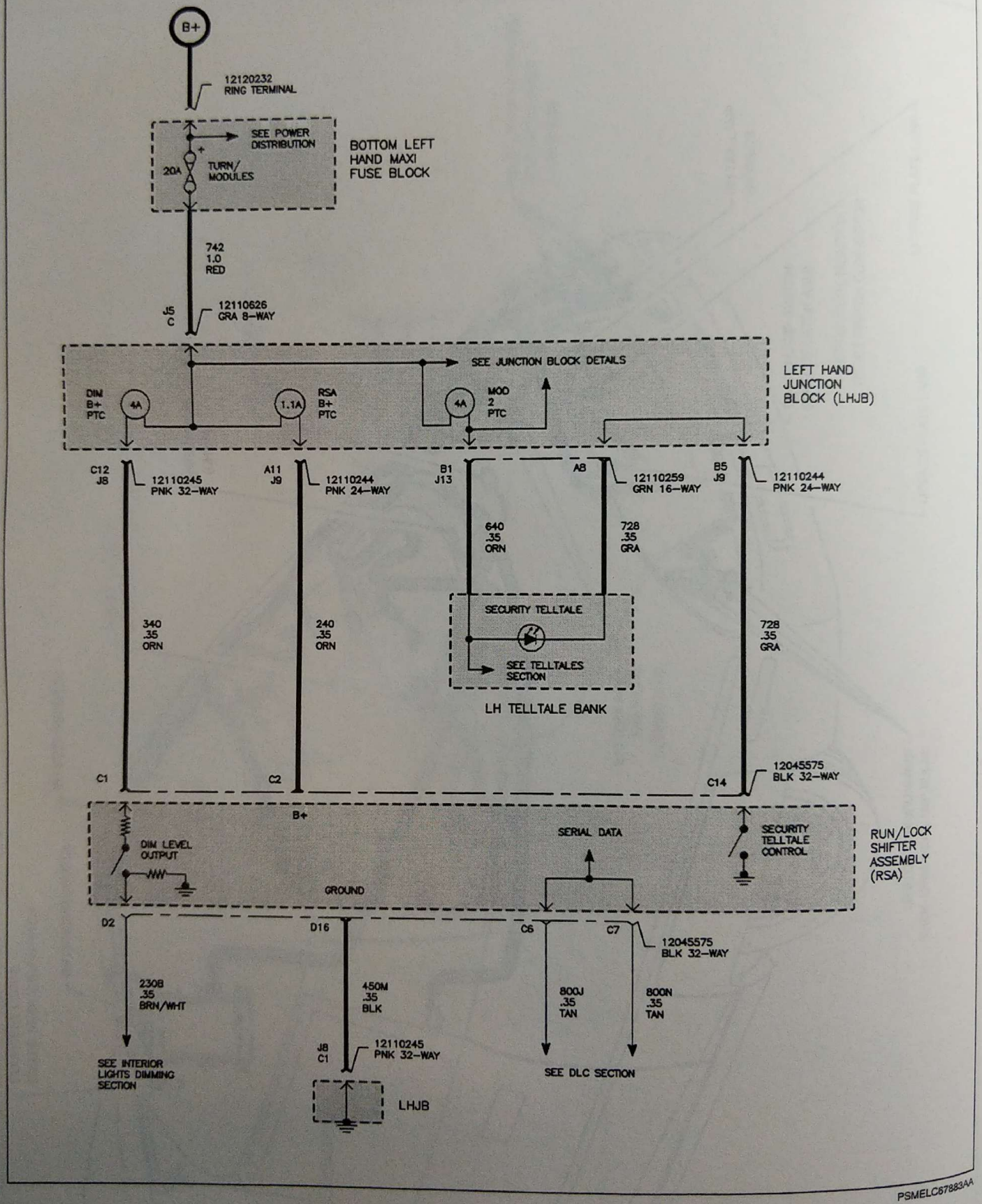
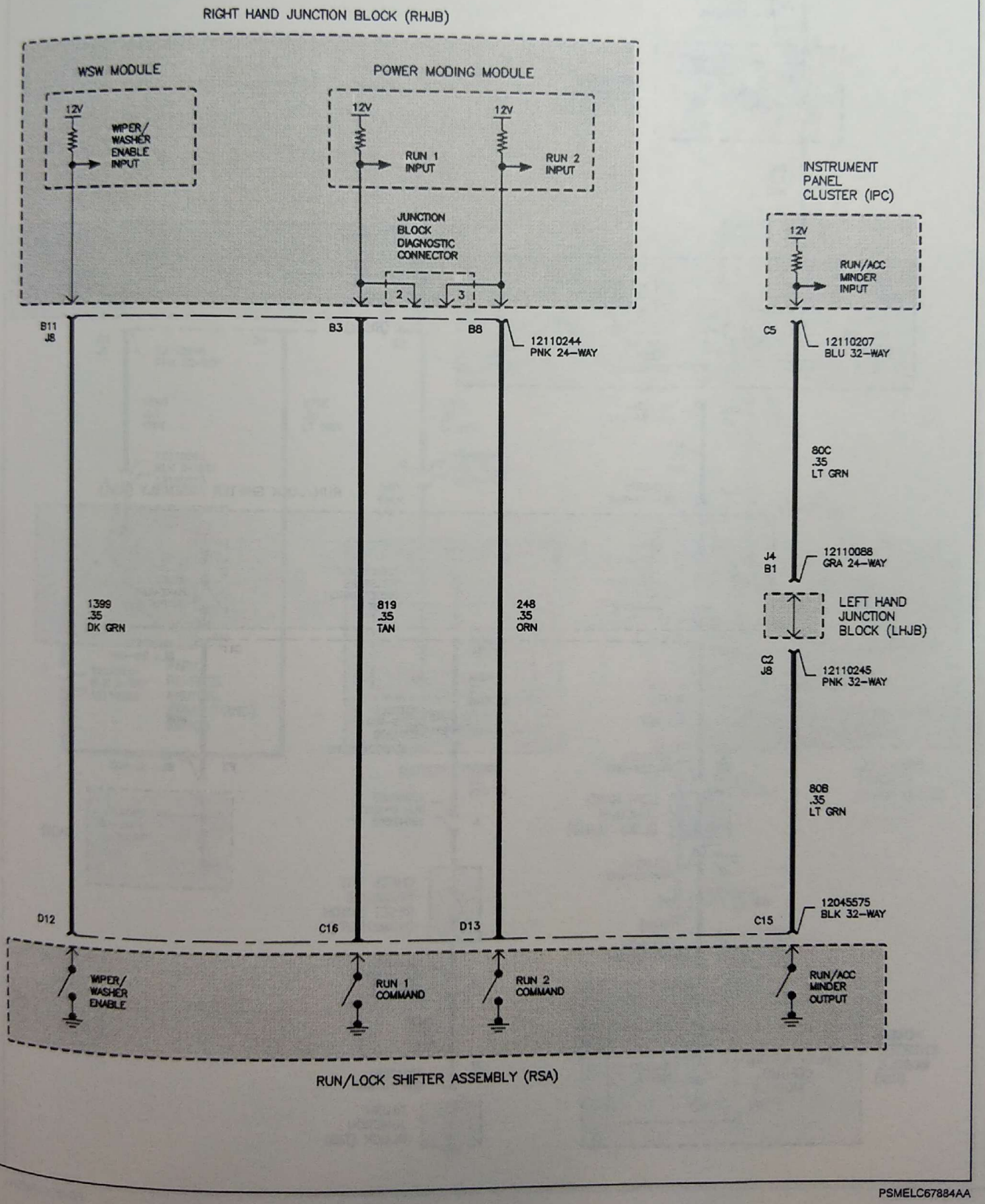
RUN/LOCK SHIFTER ASSEMBLY





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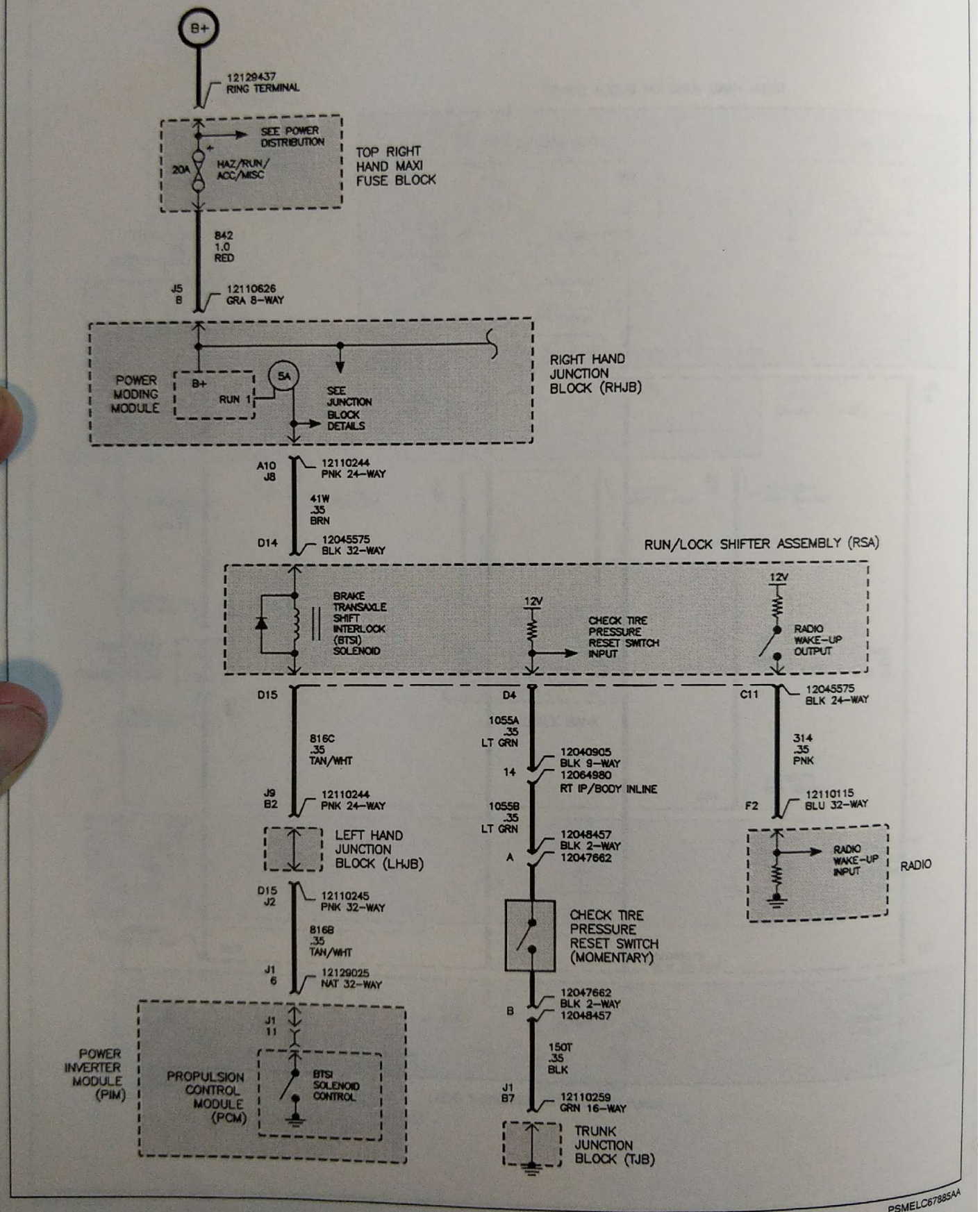
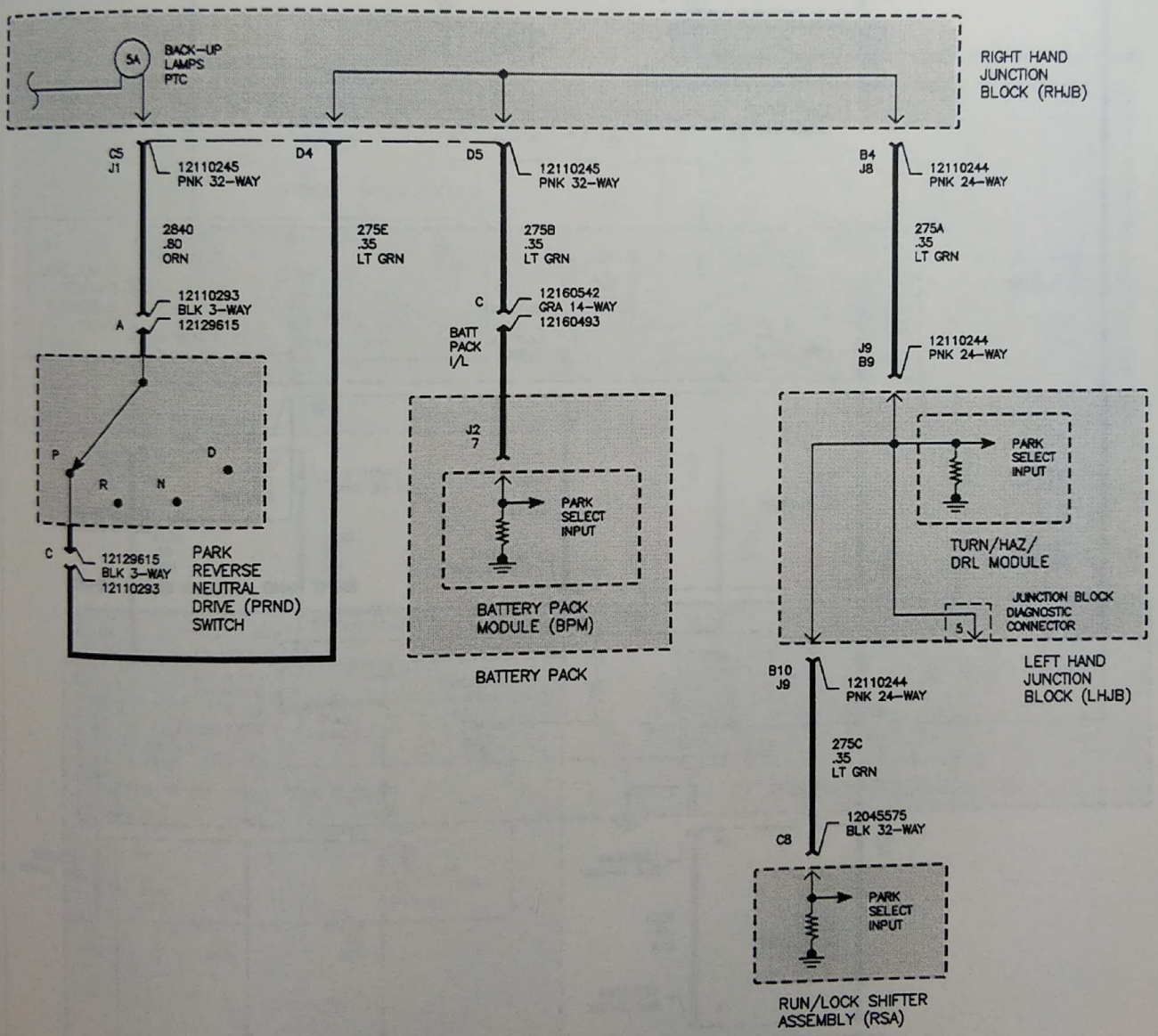

B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION
20A
HAZ/RUN/ ACC/MISC
TOP RIGHT HAND MAXI FUSE BLOCK
842
1.0
RED
J5
B
12110626
GRA 8-WAY
POWER MODING MODULE
B+
RUN 1
5A
SEE JUNCTION BLOCK DETAILS
RIGHT HAND JUNCTION BLOCK (RHJB)
A10
J8
12110244
PNK 24-WAY
41W
.35
BRN
D14
12045575
BLK 32-WAY
RUN/LOCK SHIFTER ASSEMBLY (RSA)
BRAKE TRANSAXLE SHIFT INTERLOCK (BTSI) SOLENOID
12V
CHECK TIRE PRESSURE RESET SWITCH INPUT
12V
RADIO WAKE-UP OUTPUT
D15
816C
.35
TAN/WHT
J9
B2
12110244
PNK 24-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
D15
J2
12110245
PNK 32-WAY
816B
.35
TAN/WHT
J1
6
12129025
NAT 32-WAY
D4
1055A
.35
LT GRN
14
12040905
BLK 9-WAY
12064980
RT I/P/BODY INLINE
1055B
.35
LT GRN
A
12048457
BLK 2-WAY
12047662
CHECK TIRE PRESSURE RESET SWITCH (MOMENTARY)
B
12047662
BLK 2-WAY
12048457
150T
.35
BLK
J1
B7
12110259
GRN 16-WAY
TRUNK JUNCTION BLOCK (TJB)
C11
12045575
BLK 24-WAY
314
.35
PNK
F2
12110115
BLU 32-WAY
RADIO WAKE-UP INPUT
RADIO
J1
11
POWER INVERTER MODULE (PIM)
PROPULSION CONTROL MODULE (PCM)
BTSI SOLENOID CONTROL
PSMELC67885AA



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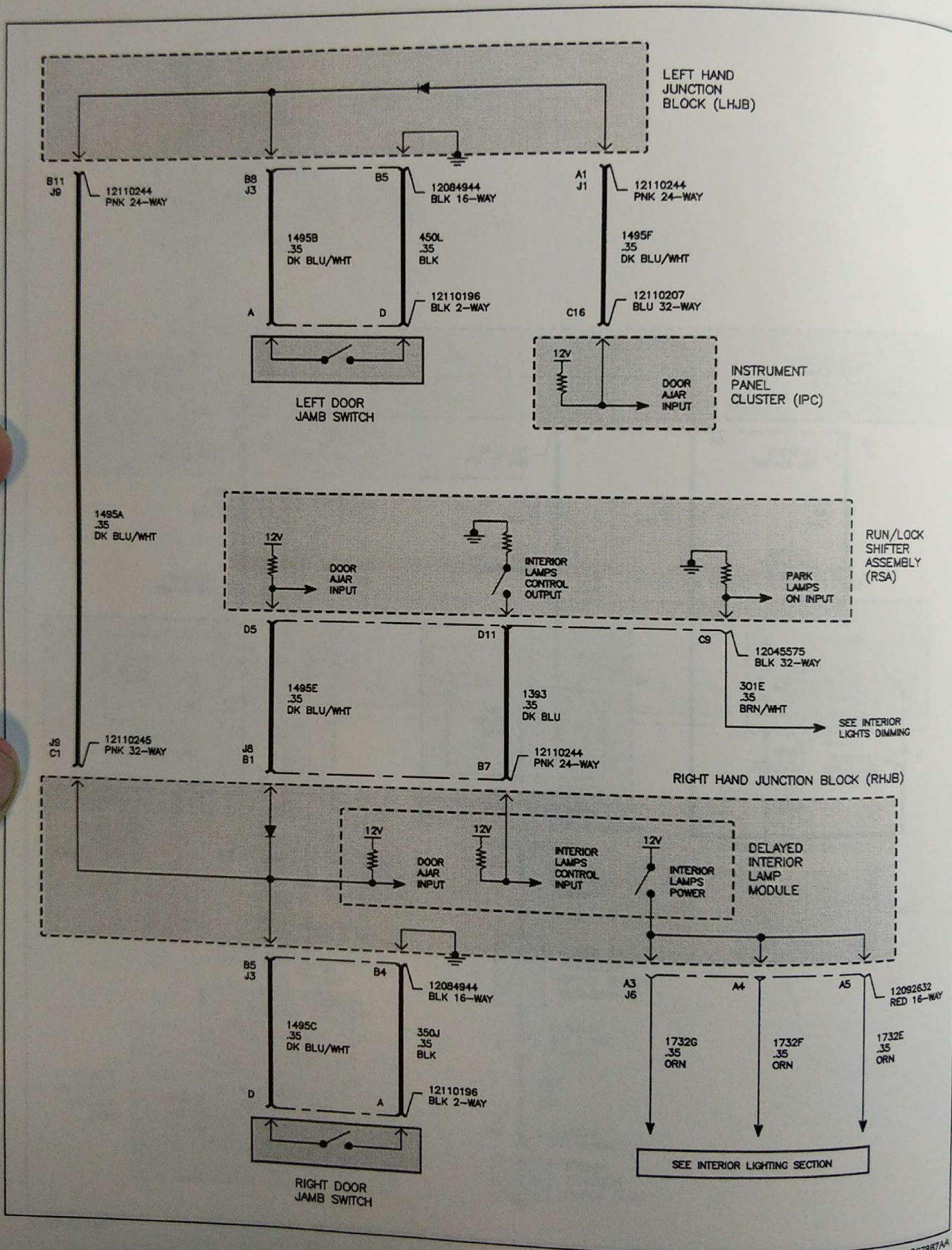
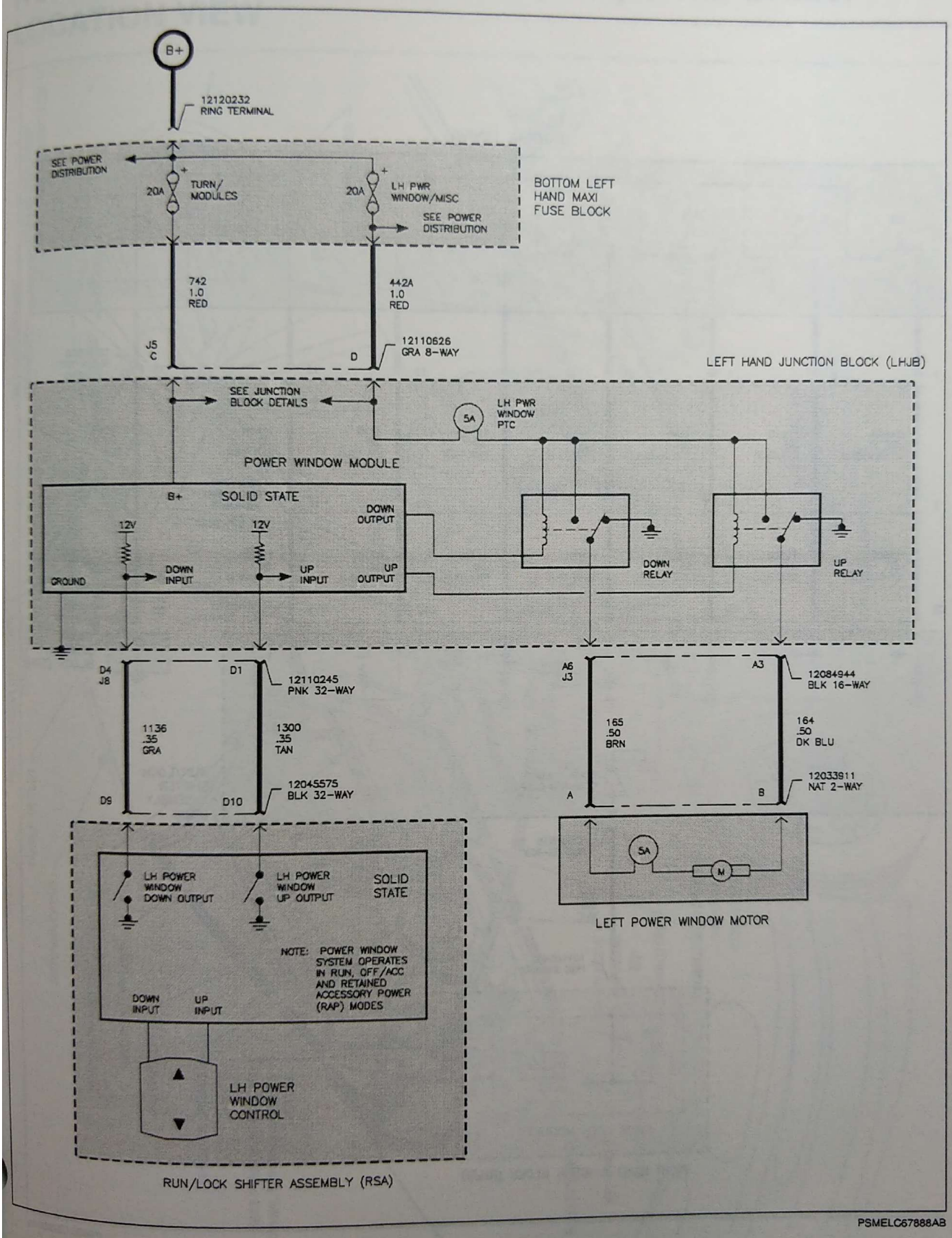

LEFT HAND JUNCTION BLOCK (LHJB)
B11 J9
12110244 PNK 24-WAY
B8 J3
B5
12084944 BLK 16-WAY
1495B .35 DK BLU/WHT
450L .35 BLK
A
D
12110196 BLK 2-WAY
LEFT DOOR JAMB SWITCH
A1 J1
12110244 PNK 24-WAY
1495F .35 DK BLU/WHT
C16
12110207 BLU 32-WAY
12V
DOOR AJAR INPUT
INSTRUMENT PANEL CLUSTER (IPC)
1495A .35 DK BLU/WHT
12V
DOOR AJAR INPUT
INTERIOR LAMPS CONTROL OUTPUT
PARK LAMPS ON INPUT
RUN/LOCK SHIFTER ASSEMBLY (RSA)
D5
D11
C9
12045575 BLK 32-WAY
1495E .35 DK BLU/WHT
1393 .35 DK BLU
301E .35 BRN/WHT
SEE INTERIOR LIGHTS DIMMING
J9 C1
12110245 PNK 32-WAY
J8 B1
B7
12110244 PNK 24-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
12V
DOOR AJAR INPUT
12V
INTERIOR LAMPS CONTROL INPUT
12V
INTERIOR LAMPS POWER
DELAYED INTERIOR LAMP MODULE
B5 J3
B4
12084944 BLK 16-WAY
1495C .35 DK BLU/WHT
350J .35 BLK
D
A
12110196 BLK 2-WAY
RIGHT DOOR JAMB SWITCH
A3 J6
A4
A5
12092632 RED 16-WAY
1732G .35 ORN
1732F .35 ORN
1732E .35 ORN
SEE INTERIOR LIGHTING SECTION
PSMELC67887AA



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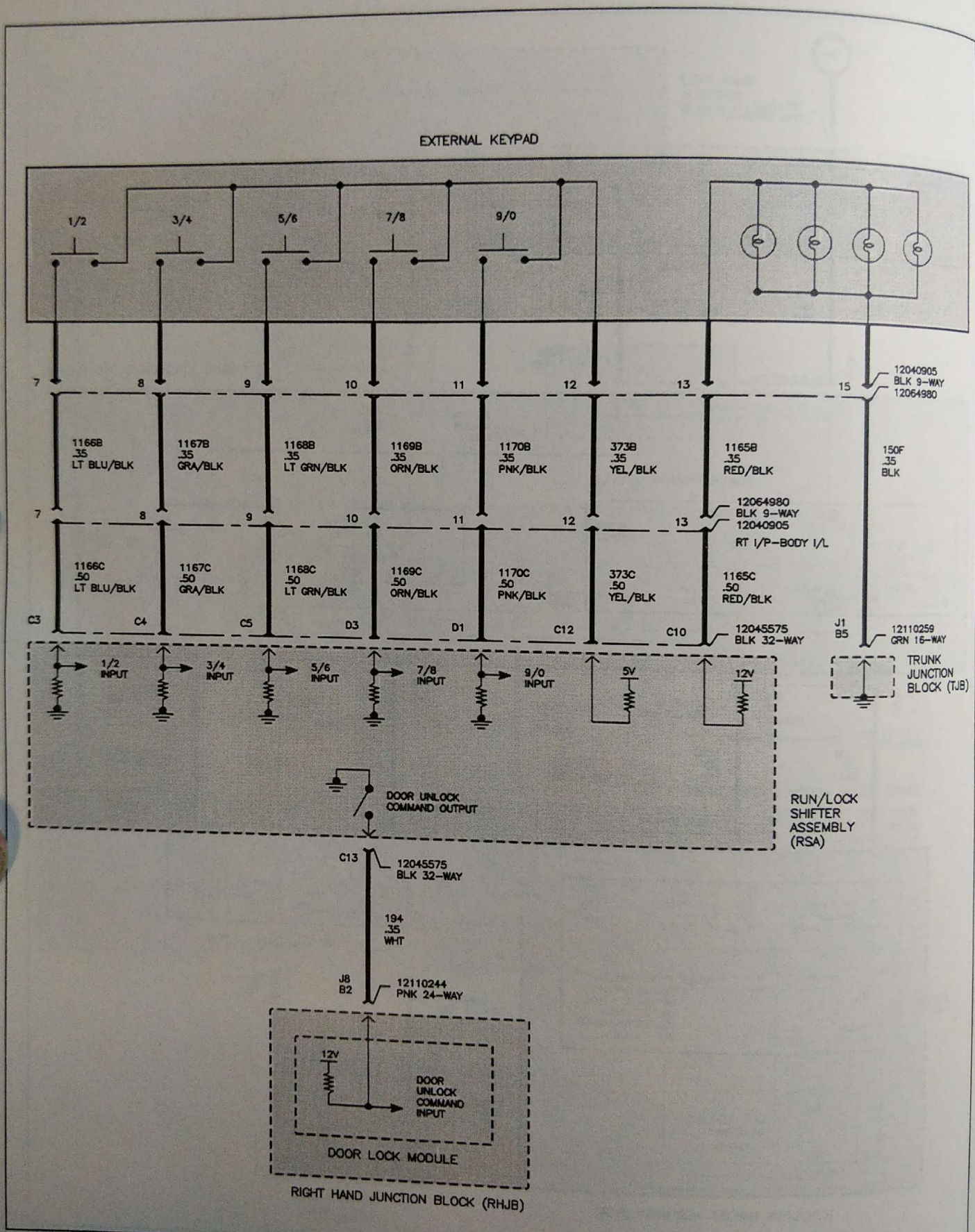
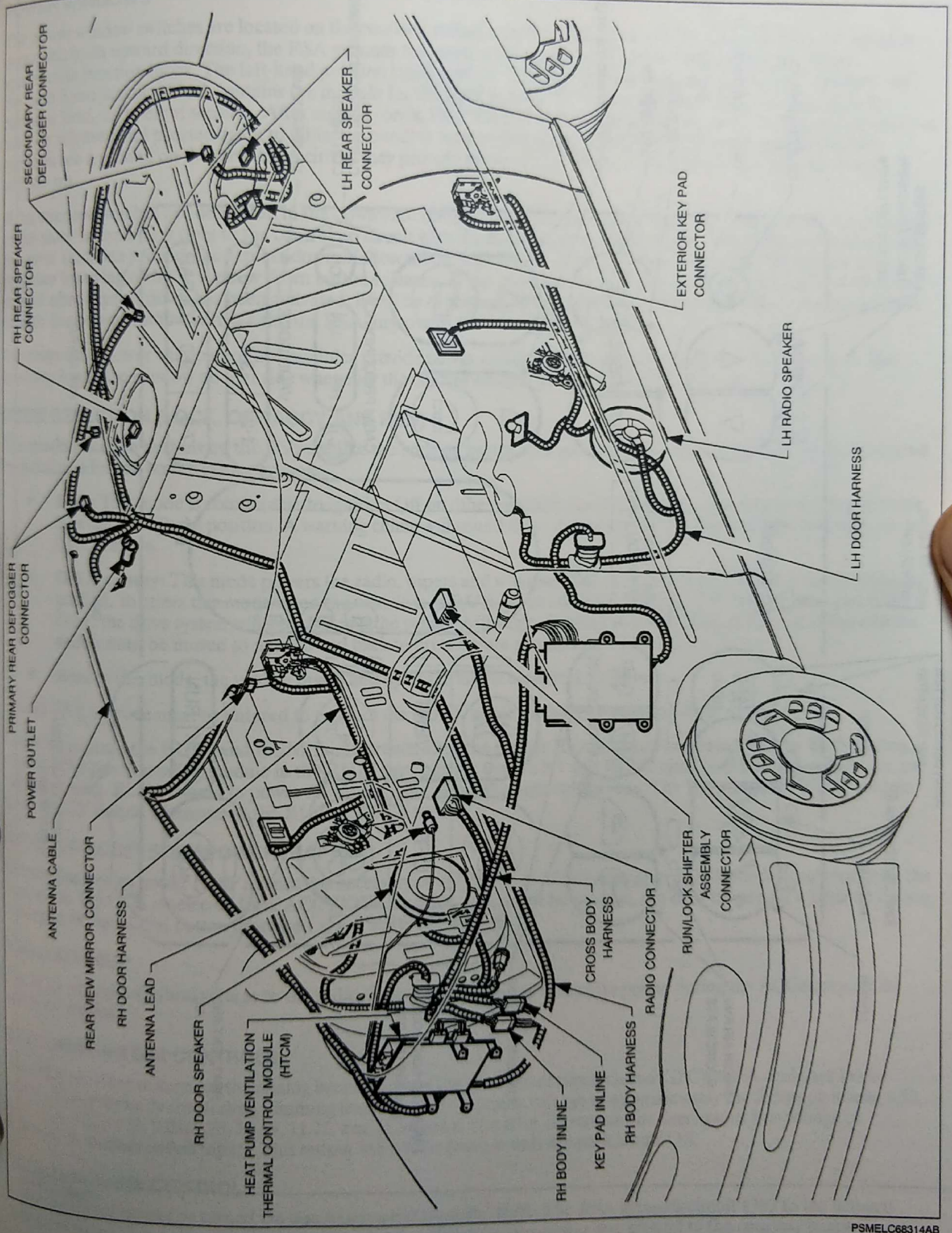

EXTERNAL KEYPAD
1/2
3/4
5/6
7/8
9/0
7
8
9
10
11
12
13
15
12040905
BLK 9-WAY
12064980
1166B
.35
LT BLU/BLK
1167B
.35
GRA/BLK
1168B
.35
LT GRN/BLK
1169B
.35
ORN/BLK
1170B
.35
PNK/BLK
373B
.35
YEL/BLK
1165B
.35
RED/BLK
150F
.35
BLK
12064980
BLK 9-WAY
12040905
RT I/P-BODY I/L
1166C
.50
LT BLU/BLK
1167C
.50
GRA/BLK
1168C
.50
LT GRN/BLK
1169C
.50
ORN/BLK
1170C
.50
PNK/BLK
373C
.50
YEL/BLK
1165C
.50
RED/BLK
C3
C4
C5
D3
D1
C12
C10
12045575
BLK 32-WAY
J1
B5
12110259
GRN 16-WAY
TRUNK
JUNCTION
BLOCK (TJB)
1/2
INPUT
3/4
INPUT
5/6
INPUT
7/8
INPUT
9/0
INPUT
5V
12V
DOOR UNLOCK
COMMAND OUTPUT
RUN/LOCK
SHIFTER
ASSEMBLY
(RSA)
C13
12045575
BLK 32-WAY
194
.35
WHT
J8
B2
12110244
PNK 24-WAY
12V
DOOR
UNLOCK
COMMAND
INPUT
DOOR LOCK MODULE
RIGHT HAND JUNCTION BLOCK (RHJB)
PSMELC67890AA

RUN/LOCK SHIFTER ASSEMBLY (RSA) COMPONENT LOCATION VIEW



PSMELC68314AB

RUN/LOCK SHIFTER ASSEMBLY (RSA)

RUN/LOCK SHIFTER ASSEMBLY (RSA)

GENERAL DESCRIPTION

POWER WINDOWS

The power window switches are located on the run/lock shifter assembly (RSA) pad. When a power window button is depressed in an upward direction, the RSA grounds the control up circuit to the power window module in the appropriate junction block. The left-hand junction block contains the power window module for the left window, and the right hand junction block contains the module for the right window. The RSA grounds the circuit as long as the button is held, up to eight seconds. After eight seconds, the RSA releases the ground to the module. The window button must be released and pressed again to initiate grounding for another eight seconds. Whenever the power window modules see a ground on the control up circuit they provide power and ground to the window motor to move the window up.

If the window switches are depressed in the downward direction, the RSA provides a ground to the control down circuit in the same manner as it does to the control up circuit with the following exception: if the window down button is held for more than one second, the express down window mode is activated. In the express down mode the window will continue lowering with the window down button released. If the window button is pressed down or up for less than one second after express down has been activated, it will be cancelled. After eight seconds in either the express down mode or with the power window switch held, the RSA ungrounds the control down circuit.

The respective power window control modules provide power and ground to the window motor that it controls. The modules lower the window on that side whenever the control down circuit is grounded.

MODE SELECTION (LOCK, OFF/ACCY, AND RUN)

The mode selection buttons on the EV1 are like the ignition switch on a gasoline powered vehicle. The mode is selected by pressing a button on the center console.

- **Lock:** This mode is comparable to ignition Off on other vehicles. Lock cannot be selected unless the shift lever is in the "P" (Park) position. A warning chime will sound if the driver's door is opened and the vehicle is not in LOCK mode.
- **Off/Accessory:** This mode powers the radio, wipers and windows. Select the OFF/ACC mode if the car must be pushed. To select this mode when the vehicle is in RUN, press and hold OFF/ACC for one second. But if this is done, the drive system will shut Off and the vehicle will begin coasting to a stop. Run must be selected and the shifter must be moved to neutral and back to drive before propulsion will return.
- **Run:** In this mode, the vehicle drives and operates all the electrical accessories.

A valid RSA keycode must be entered to go from the LOCK mode to the OFF/ACC or RUN mode.

The RSA grounds the RUN1 and RUN2 input circuits after the proper RSA keycode is entered and the RUN button is pressed. The power moding module in the RHJB then powers the RUN1 and RUN2 circuits. RUN1 is used for the low voltage circuits. RUN2 is used to power the devices that affect the high voltage bus. The RSA provides RUN1 voltage to the ACCY output whenever in the RUN or ACCY modes.

RETAINED ACCESSORY POWER (RAP)

Retained accessory power (RAP) maintains accessory power for up to 10 minutes after LOCK mode is entered from the Run mode. If LOCK is selected from ACCY/OFF mode, RAP will not be present. If a door is opened, a keycode button is pressed or the LOCK button is pressed again, RAP will shut off.

RADIO WAKEUP

The RSA provides ignition voltage to the radio. This acts as a wakeup and radio power during the ACCessory, RUN and RAP modes.

BACKLIGHTING DIM CONTROLS

The RSA provides voltage for the analog backlighting of the instrument panel cluster (IPC), radio, and park brake switch in proportion to the desired dimming level. The RSA outputs voltage at approximately the following levels: 5.52, 6.22, 6.92, 7.62, 8.33, 9.05, 9.76, 10.49, 11.21, and 11.94 volts. The RSA increments or decrements this voltage in response to dimmer switch inputs. This output will not be present with the park lamps Off.

COURTESY LAMP CONTROL

The courtesy lights may be turned On due to a request from the RSA. The RSA grounds circuit 1393 to the delayed interior lamp module in the right hand junction block, which provides power and ground to the courtesy lamps.

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If the park lamps are not On in the RUN mode and the dim up button is held for one second, the courtesy lights will be turned On. If the park lamps are On in the RUN mode, the dim up switch can be held to ramp up backlight dimming to a maximum brightness and then if the button is held for another second the courtesy lights will be turned On. The courtesy lamp ON command from the RSA will be turned Off if the dim down switch is depressed. The courtesy lights are not turned On by the RSA if not in the RUN mode.

RSA KEYPAD

The EV1 doesn't have an ignition key and an ignition switch like a gasoline-powered vehicle. Instead, the RSA keycode replaces the ignition key, and the keypad and mode selection buttons on the console replace the ignition switch. To enter the RUN mode on the EV1, enter the five-digit RSA keycode on the keypad while the backlighting is On. (The backlighting will come on for a minute when a door is opened and for 10 seconds when any RSA button is pressed). The valid code LED should come on as soon as the correct keycode is entered. Now press the RUN button. The RUN LED should come On and the vehicle will be in the RUN mode.

When a new EV1 is delivered, the retailer programs the five-digit external keypad and RSA keycodes and writes the keycodes on the key tag.

SECURITY TELLTALE/DISABLE

If the correct DTC sequence is not entered into RSA or the External Keypad (EKP) within 25 key entries, the RSA grounds circuit 728 to turn on the security telltale and goes into "Passkey Disable" mode. The RSA remains in this mode for three minutes during which time the security telltale remains lit and there is no response to the EKP or the RSA keypad. When the three minutes have expired the RSA will wake up with key inputs and read up to another 25 key entries on either the EKP or the RSA keypad.

CHANGING THE RSA KEYCODE

The five-digit RSA keycode can be changed using the following procedure. During this procedure, letting 10 seconds pass without pressing a key or pressing "OFF/ACC" or "LOCK" will cancel the procedure. If this happens, all of the steps must be repeated.

1. Make sure the shift lever is in P (Park).
2. Make sure both doors are closed.
3. Using the keypad on the RSA, enter the current five-digit RSA keycode and select the RUN mode.
4. Press and hold the "1•2" key for about three seconds. The VALID code light should start to flash slowly.
5. Enter the new five digit RSA keycode. Once all five digits have been entered, the VALID code light should stop flashing and remain On for about two seconds.

If a mistake is made before all five digits have been entered, press CLEAR. The digits entered will be erased. Step 5 then can be repeated.

6. Wait for the VALID code light to flash slowly again.
7. Enter the five digits of the new RSA keycode again. Once all five digits have been entered again, the "VALID code" light should stop flashing and remain On for about two seconds.

NOTICE: The RSA user keycode should be set to all ones (1, 1, 1, 1, 1) before returning the RSA to the manufacturer for warranty.

When the "VALID code" light goes out, it means the old keycode has been erased and the new RSA keycode can be used.

If the key DTC entered in step 7 is not the same new keycode entered in step 5, try to enter it two more times. If the keycode is not matched after three attempts, the RSA keycode will not be changed. All of these steps would have to be repeated to change the RSA keycode.

EXTERNAL KEYPAD

Entering the five digit external keypad keycode on the keypad by the driver unlocks both doors. Don't press the buttons with a hard object, like a key or a pen as that could damage the buttons. When using the external keypad, the keypad backlighting and the courtesy lamps come On. After five seconds without pressing a button, the keypad light will go out and the system will shut down. If this happens before the doors are unlocked the entire external keypad keycode must be entered again.

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If 25 digits are entered without entering a valid five digit keycode, the keypad will turn Off for three minutes and the security telltale on the instrument panel will come On. Once the security telltale goes Off, the external keypad keycode can be re-entered. While the security telltale is On, neither the external keypad nor the RSA keypad key DTCs will operate. The RSA provides five volts to the external keypad at all times, even when the RSA is in sleep mode. The external keypad provides a return voltage to the RSA on the appropriate circuit when a given keypad button is depressed.

EXTERNAL KEYPAD KEYCODE

The external keypad unlocks both doors when the proper keycode is entered. When a new EV1 is delivered, the retailer receives a five digit keycode to open the doors and enable RUN mode. The retailer files this keycode and gives the five digit external keypad keycode to the first owner. The keycode can then be changed by using the following procedure. Use the keypad on the RSA inside the vehicle to follow this procedure—not the external keypad.

CHANGING THE EXTERNAL KEYPAD KEYCODE

During this procedure, letting 10 seconds pass without pressing a key or pressing OFF/ACC or LOCK will cancel the procedure. If this happens, all of the steps must be repeated.

1. Make sure the shift lever is in P (Park).
2. Make sure both doors are closed.
3. Using the RSA keypad, enter the five digit RSA keycode and select the RUN mode.
4. Press and hold the "3•4" key on the RSA keypad for about three seconds. The VALID CODE light should start to flash slowly.
5. Enter the five digit new external keypad keycode. Once all five digits have been entered, the VALID CODE light should stop flashing and remain On for about two seconds.

If you make a mistake before all five digits have been entered, press CLEAR. The digits you entered will be erased, and you can then repeat step 5.

6. Wait for the VALID CODE light to flash slowly again.
7. Enter the five digits of the new external keypad keycode again. Once all five digits have been entered again, the VALID CODE light should stop flashing and remain On for about two seconds.

When the VALID CODE light goes out, it means the old keycode has been erased and the new external keypad keycode can be used.

If the keycode entered in step 7 is not the same new keycode entered in step 5, try to enter it two more times. If the keycode isn't matched after three attempts the external keypad keycode will not be changed. All of these steps would have to be repeated to change the external keypad keycode.

COAST DOWN FEATURE

The EV1 is more aerodynamically efficient and rolls more easily than a gasoline-powered vehicle. When the EV1 is in "D" (Drive) and you take your foot off the accelerator pedal, the EV1 coasts freely. The coast down feature causes the EV1 to slow down more quickly. It produces an engine braking feel similar to a gasoline-powered vehicle with an automatic transmission.

To turn the feature On, press the "COAST-DOWN" button on the side of the shift lever. The "COAST-DOWN" LED on the center console indicates when the coast-down feature is On.

The coast-down feature remains in the state last selected (On or Off) until the button is pressed again, even if the vehicle is turned Off and back On.

CAUTION: THE COAST-DOWN FEATURE CAN BE DANGEROUS ON SLIPPERY ROADS. ON SLIPPERY ROADS, FAST CHANGES IN TIRE TRACTION CAN CAUSE THE VEHICLE TO SLIDE AND YOU COULD LOSE CONTROL. DON'T USE THE COAST-DOWN FEATURE ON SLIPPERY ROADS.

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CABIN PRECONDITIONING

Preconditioning provides heating or cooling to the EV1 before driving using power from the charging station. This helps conserve battery power that would have been used to get the vehicle to a comfortable temperature.

During preconditioning, the cabin will be heated or cooled as needed based on the outside air temperature and the cabin air temperature. Preconditioning must be enabled each time you want to use it.

Preconditioning will work only when using a wall or floor mounted charger. It only takes about 15 minutes to precondition your EV1. However, the paddle must be inserted into the charge port and the battery charge must be above 80% before preconditioning begins, or it will not come On.

To precondition the cabin of the EV1:

1. Switch the vehicle to RUN.
2. Display the preconditioning-complete time on the cluster by pressing the HR (hour) or MN (minute) button on the center console. The preconditioning-complete time will be preceded by a P and it will remain on the display for about five seconds.
3. Set (or verify) the preconditioning-complete time. This is the time when the preconditioning will be complete—not the time the preconditioning will start. (Preconditioning will begin about 15 minutes prior to the preconditioning-complete time.) Press the HR or MN button briefly to advance the set time one hour or minute. Holding the HR or MN button causes the setting to keep advancing until the button is released.
4. Display the current time by pressing the button that looks like a clock. The current time will be preceded by a D and will remain on the display for about five seconds.
5. Make sure the current time is correct. If it is not, set the correct time. By pressing the button that looks like a clock and the HR or MN button briefly, the setting will advance one hour or minute. When the button that looks like a clock and the HR or MN button is pressed and held, the setting will keep advancing until the button is released. Changing this time setting doesn't affect the time setting on the radio. The radio clock is set separately.
6. Turn on the pre-conditioning system by pressing the pre-condition ON button on the center console. The light above the ON button will come On. This light indicates that pre-conditioning has been set and will be completed at the pre-conditioning-complete time that was set (provided that steps 7 and 8 are completed). It doesn't indicate that pre-conditioning is taking place.
7. Switch the vehicle to LOCK.
8. If the vehicle isn't already connected to a wall or floor mounted charging station, insert the charge paddle into the charge port.

You can turn off preconditioning at any time by switching the vehicle to RUN and pressing the pre-condition ON button. The light above the ON button will go Off.

MI/KM BUTTON

The MI/KM button toggles the instrument panel cluster (IPC) between English units and Metric units.

TRIP/RESET

The trip button toggles the odometer between trip and season modes. When in the trip odometer mode, the trip mileage may be reset to zero by holding down the reset button for one second. The trip odometer rolls over to zero at 19,999.9 miles or 32,186.8 km. If battery power is lost to the IPC, the trip odometer will reset to zero. The season odometer will read up to 500,000 km.

GAGE BUTTON

Pressing the gage button toggles between charge level and power use displays. The charge level display appears similar to a digital fuel gage - it has eleven horizontal bars, each representing about 9% of available charge. If the charge level becomes very low, the battery life telltale will come On and a chime will sound once every five minutes as a warning. If the gage button is pressed while showing charge level, the display changes to power use - an indication of how quickly power is being used up. This display provides instant feedback to the driver so they can be aware of how driving habits and features enabled on the car affect power use. By referring to this gage a driver can modify their driving to maximize the range traveled on one charge. Power use can also be viewed during charging - in this case the bars indicate how much power is being put into the batteries.

CLIMATE CONTROL SYSTEM BUTTONS

As each button is pressed the indicator light next to the button will come On. If the climate control system can complete the request, the indicator light will stay On. If the indicator light goes Off, the system was unable to complete the request.

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CLIMATE CONTROL MODES

HEAT – Press this button for warmer air. There are three temperature settings. Press the button once to select the lowest setting, twice for the middle setting, and three times for the highest setting. If the button is pressed again the system will return to the lowest setting. The lights to the right of the button will show which setting is selected.

VENT – Press this button for air that is at the outside air temperature.

AIR CONDITIONING – Press this button for cooler air. There are three temperature settings. Press the button once to select the lowest setting, twice for the middle setting, and three times for the highest setting. If you continue to press the button, the system will cycle through the three settings again. The indicator lights to the right of the button will show which setting is selected.

OFF – Press this button to turn Off the climate control system. The ventilation system will still supply some outside air when the vehicle is moving.

AIRFLOW CONTROLS

LOWER – Press this button to direct most of the air through the lower vents.

BI-LEVEL – Press this button to direct the air through both the upper and lower vents.

UPPER – Press this button to direct most of the air through the upper vents in the instrument panel and through the vents in the doors.

FRESH AIR – Press this button to bring outside air into the vehicle.

RECIRCULATE – Press this button to recirculate most of the air inside the vehicle. Use this setting when entering a smoky or dusty area. Your air conditioning system will cool the air better when this setting is used.

FAN CONTROLS

FAN – Press these buttons to select the fan speed. There are five fan settings. Press the upper button for more air flow, and press the lower button for less air flow. If you press and hold either button, the system will cycle through the five settings. The indicators to the left of the button will show which setting is selected.

DEFOGGING AND DE-ICING

Both the windshield and the rear window can be electrically heated to clear them of fog, frost, snow, or ice. If the windshield ever becomes cracked, the heating element won't work and the service soon warning light will come On.

DEFOG – Press this button to defog the windshield on cold, humid days. The system will heat the windshield for five minutes, then it will cycle Off for three minutes and On for three minutes repeatedly to keep the windshield clear of fog. The system may be turned Off at any time by pressing the button again. For best driving range, turn Off defog when it is no longer needed.

DE-ICE– Press this button to clear the windshield of frost, snow or ice. The system will heat the windshield for 10 minutes, then it will automatically shut Off. The system may be turned Off sooner by pressing the button again. If the windshield is still not completely cleared, the button may be pressed again to turn on DE-ICE for an additional 10 minutes.

REAR – Press this button to clear the rear window of fog, frost, snow or ice. The system will heat the rear window for 10 minutes, then it will automatically shut Off. The system may be turned Off at any time by pressing the button again. If rear defog is desired beyond the 10 minutes, it may be reselected by pressing the button again.

KEYMINDER

The RSA signals the IPC whenever the car is in the RUN or accessory mode over the keyminder circuit. Whenever a door is open, the IPC tries to put out battery voltage over the keyminder circuit. If the RSA is in RUN or ACCY mode it pulls the keyminder circuit down to about 1.5-2.0 volts. This tells the IPC to turn On the keyminder warning.

SHIFTER

The shifter operates in a similar manner to shifters on other vehicles. In Park the park pawl and the parking brakes are engaged. The brake pedal must be depressed to release the BTSI solenoid before the shifter will move out of Park. If power is lost the shifter will not move out of Park. In reverse the voltage to the motor is reversed to move the vehicle in the reverse direction. In neutral the parking pawl is released and there is no power to the motor. In Drive, voltage is available to the motor to move the vehicle in the forward direction. For more information on these positions refer to the "Propulsion" service manual.

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BTSI CONTROL

The BTSI (Brake Transmission Shift Interlock) is housed in the RSA. It receives power from the RUN1 power feed. It is pulled to ground by the PCM when the brake is applied, if the PCM determines the charge port paddle is not in the charge port. When the BTSI solenoid is not powered, the shifter is prevented from moving out of park.

CHECK TIRE PRESSURE RESET

The RSA performs the calculations to determine if a low tire pressure condition is present. If the low tire pressure switch is in any mode, the RSA recalibrates the tire speed comparisons. Refer to "Check Tire Pressure System" for more information on this system.

RUN/LOCK SHIFTER ASSEMBLY (RSA) TROUBLE TREE INDEX

- Chart 1 – RSA Inoperative/ No Run Mode
- Chart 2 – Vehicle Stuck in Run Mode
- Chart 3 – No Accessory Mode
- Chart 4 – Retained Accessory Power (RAP) Inoperative
- Chart 5 – Accessory Mode/RAP Stays On in Lock Mode
- Chart 6 – Security Inoperative
- Chart 7 –External Keypad (EKP)/Backlighting Inoperative
- RSA DTC 11 - Serial Data Loss from BTCM
- RSA DTC 12 - Serial Data Loss from HTCM
- RSA DTC 13 - Serial Data Loss from PCM
- RSA DTC 23 - Tire Pressure – Low or High
- RSA DTC 33 - Tire Reports Invalid Signal

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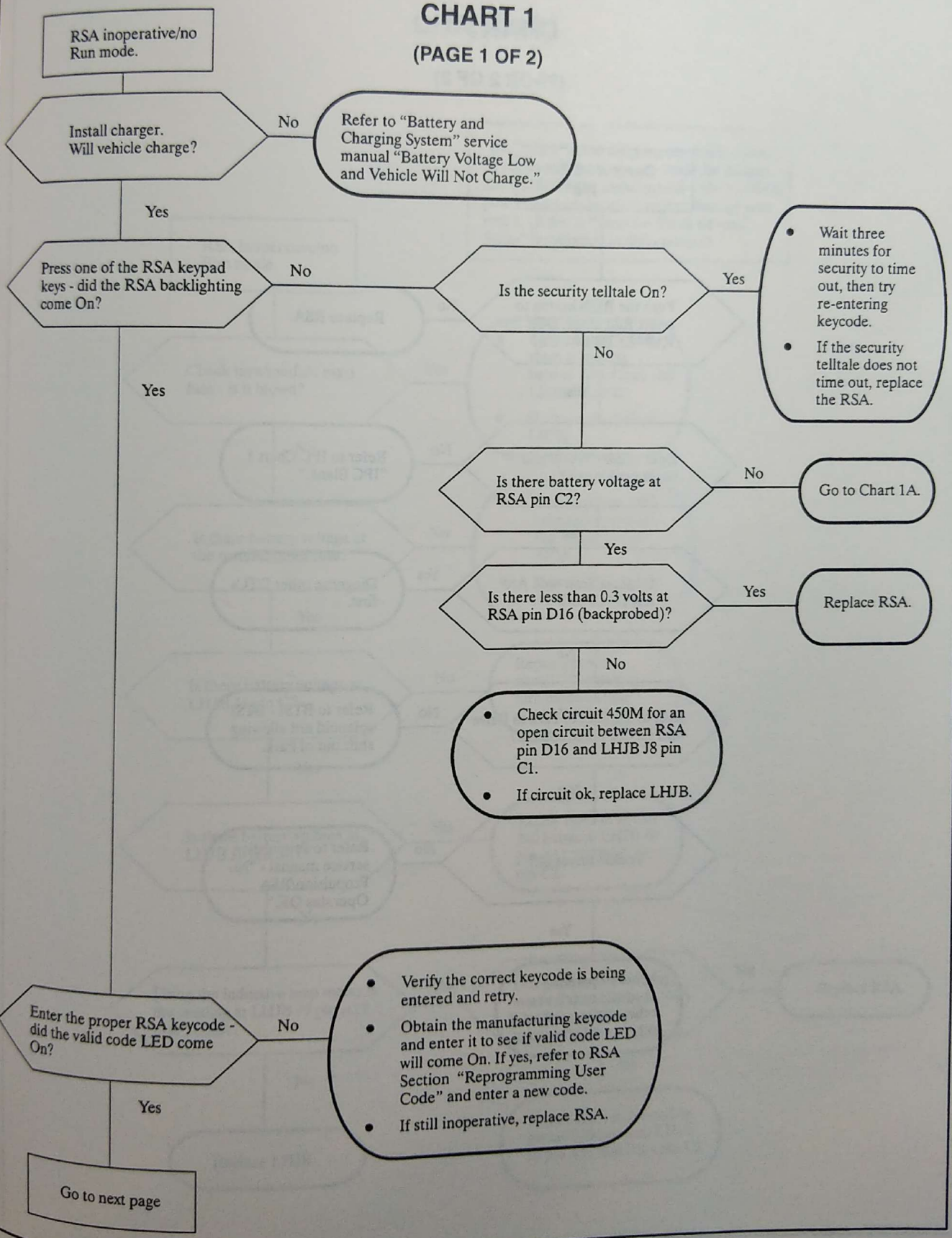
RSA INOPERATIVE/NO RUN MODE

CHART 1

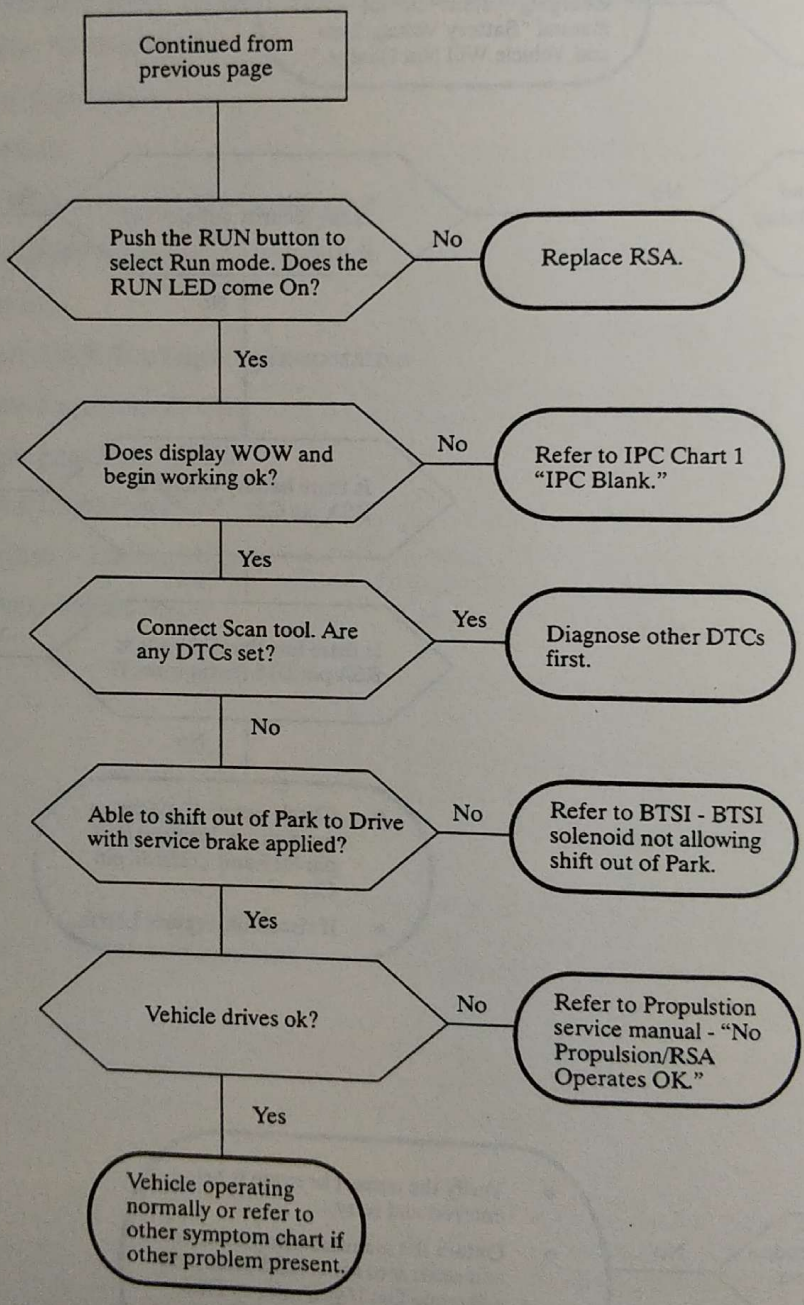
(PAGE 1 OF 2)



RSA INOPERATIVE/NO RUN MODE

CHART 1

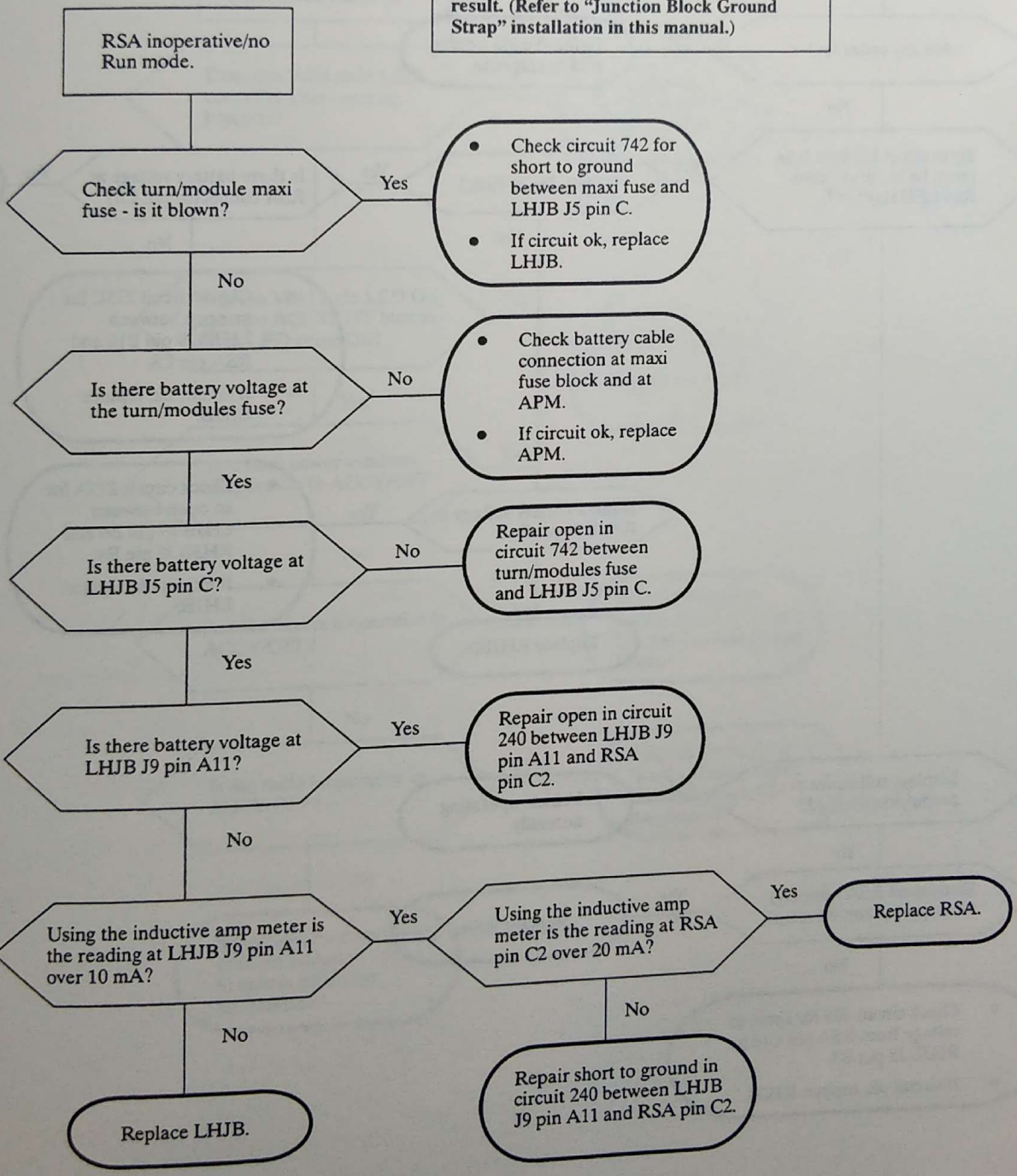
(PAGE 2 OF 2)



RSA INOPERATIVE/NO RUN MODE

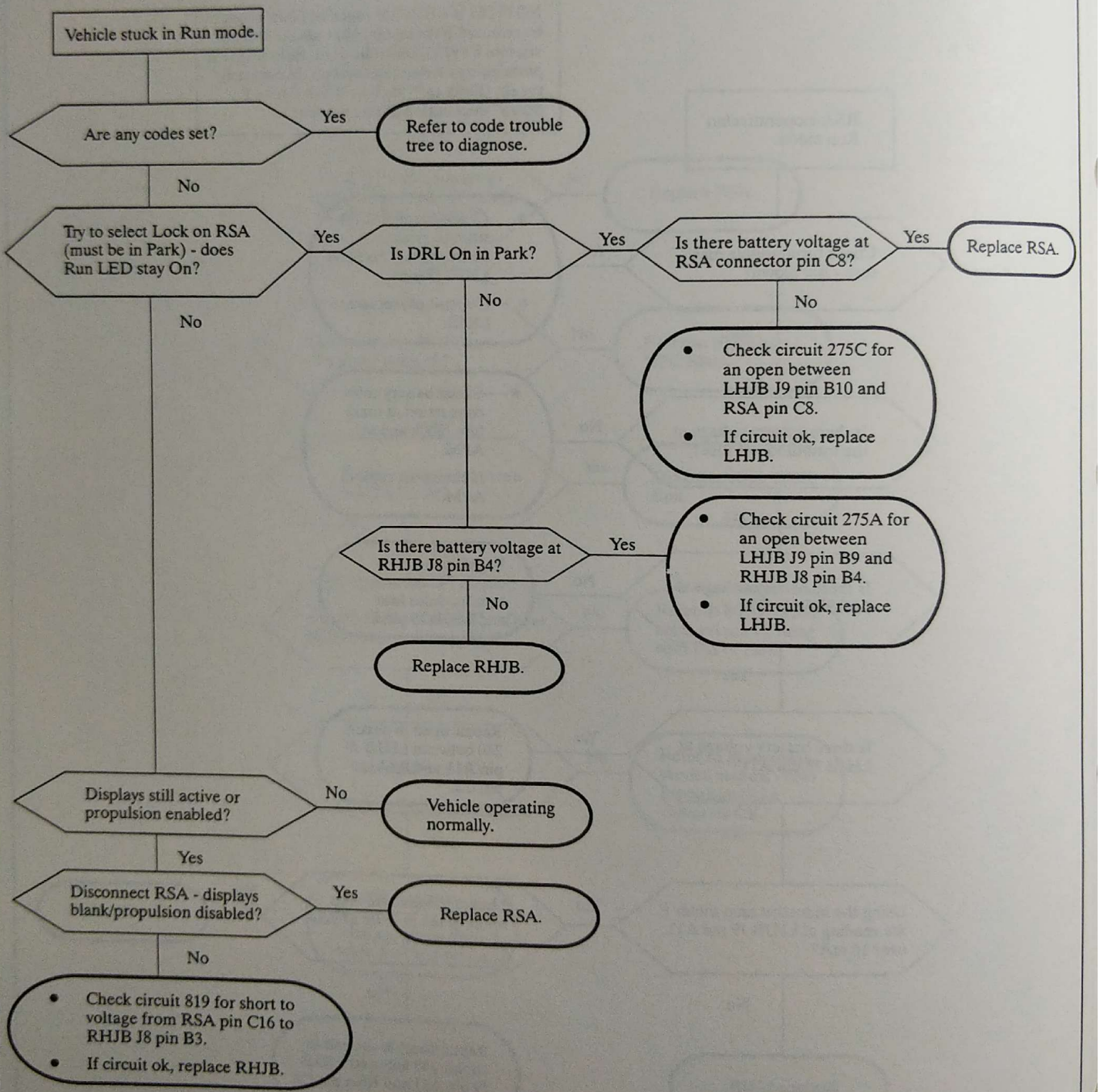
CHART 1A

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



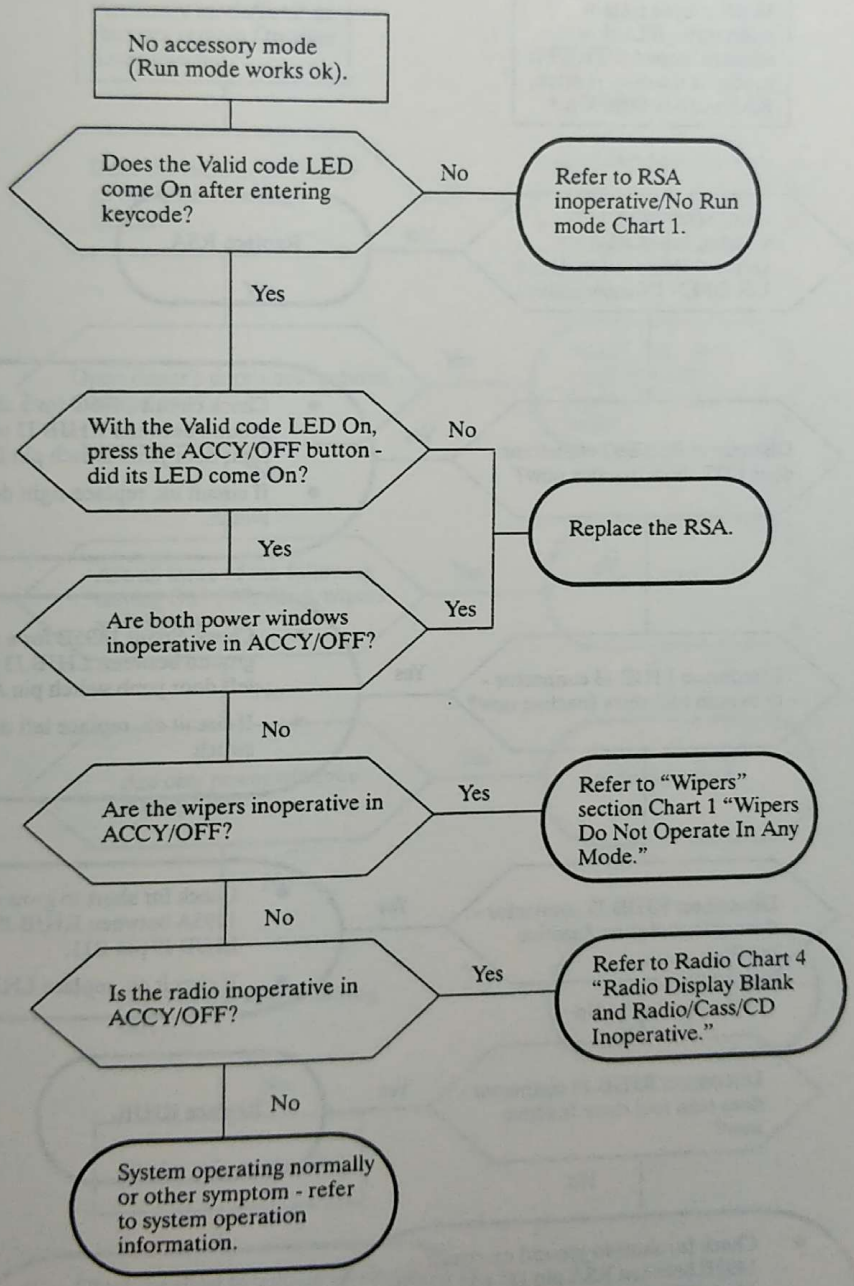
VEHICLE STUCK IN RUN MODE

CHART 2



NO ACCESSORY MODE

CHART 3



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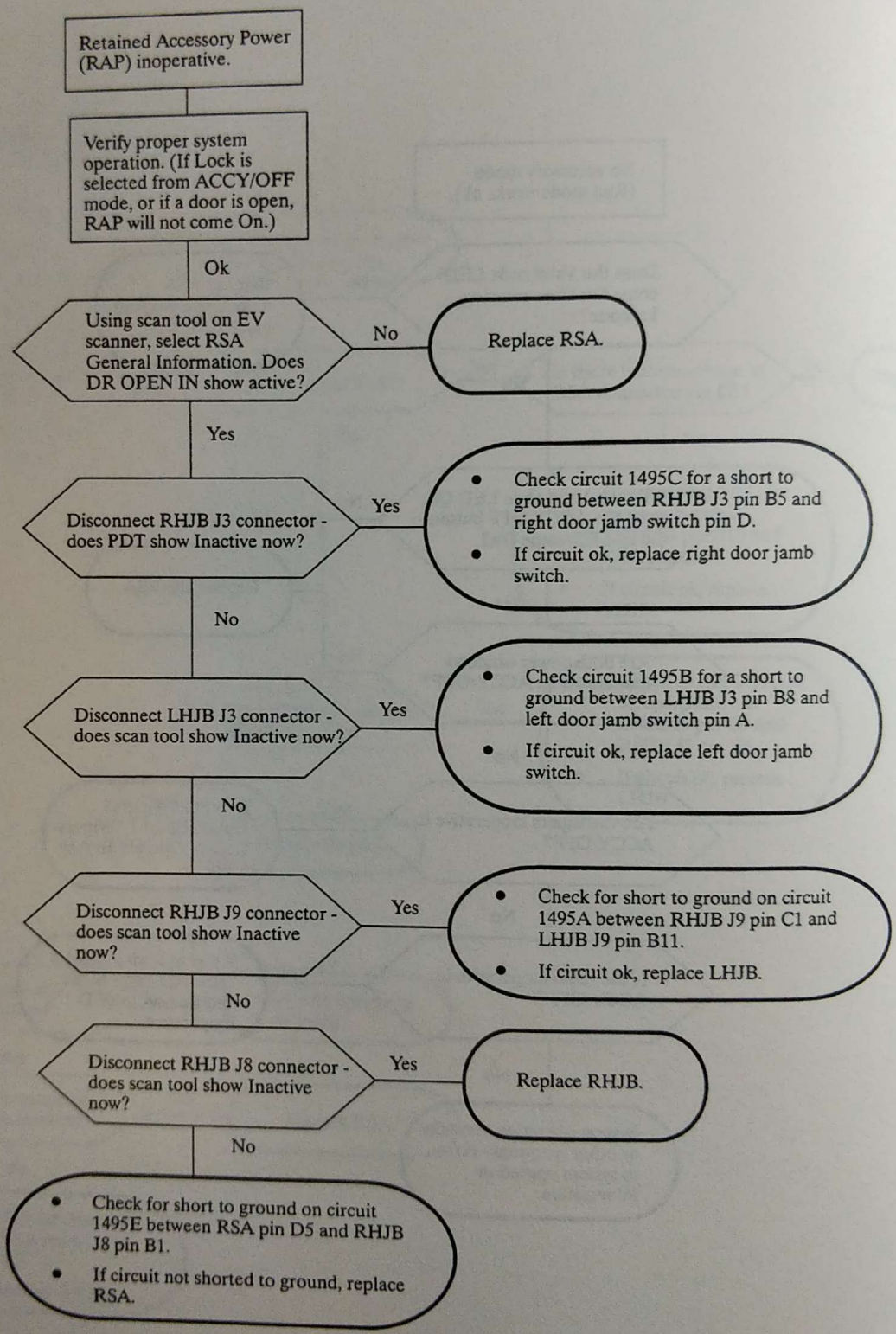
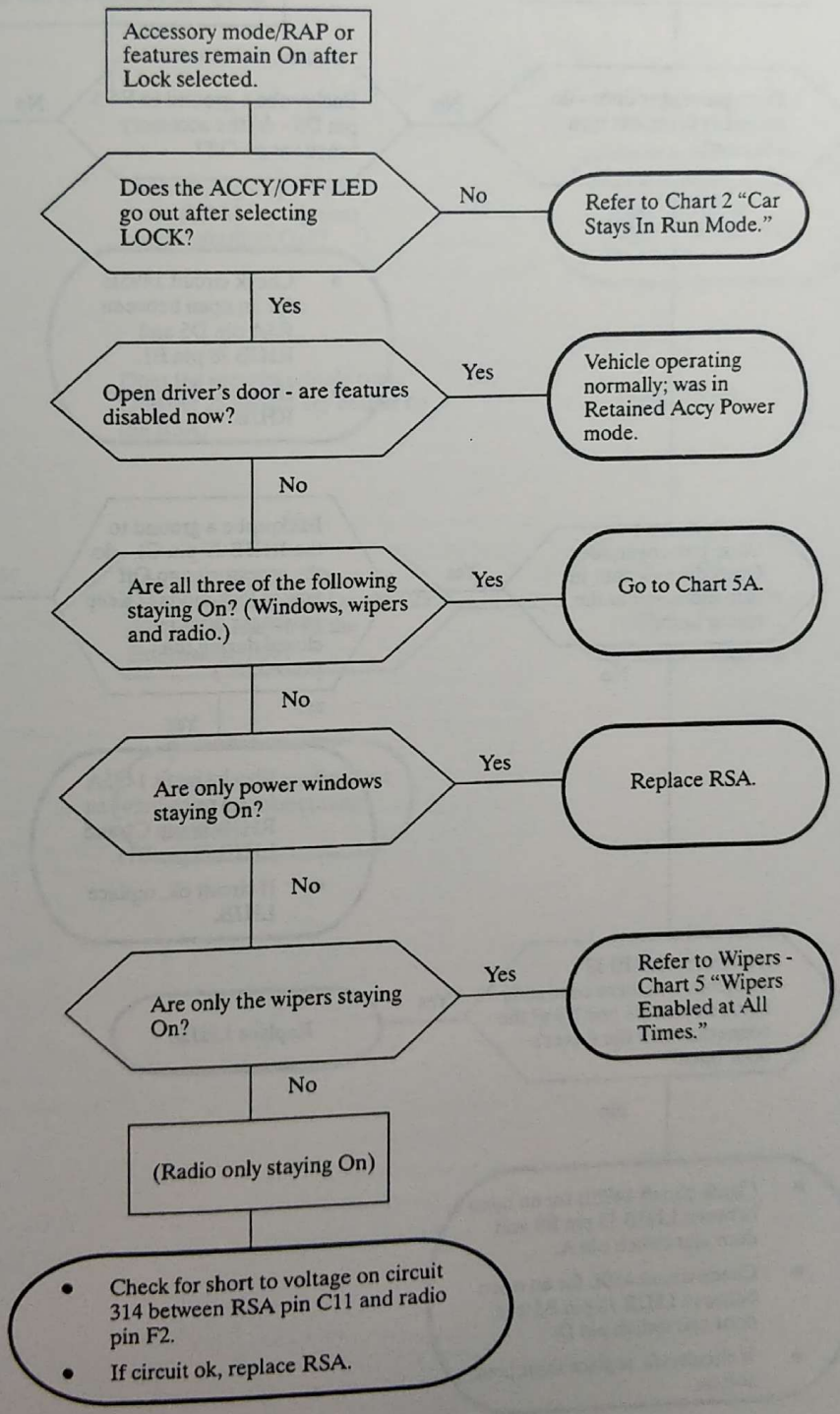
RETAINED ACCESSORY POWER (RAP) INOPERATIVE

CHART 4



ACCESSORY MODE/RAP STAYS ON IN LOCK MODE

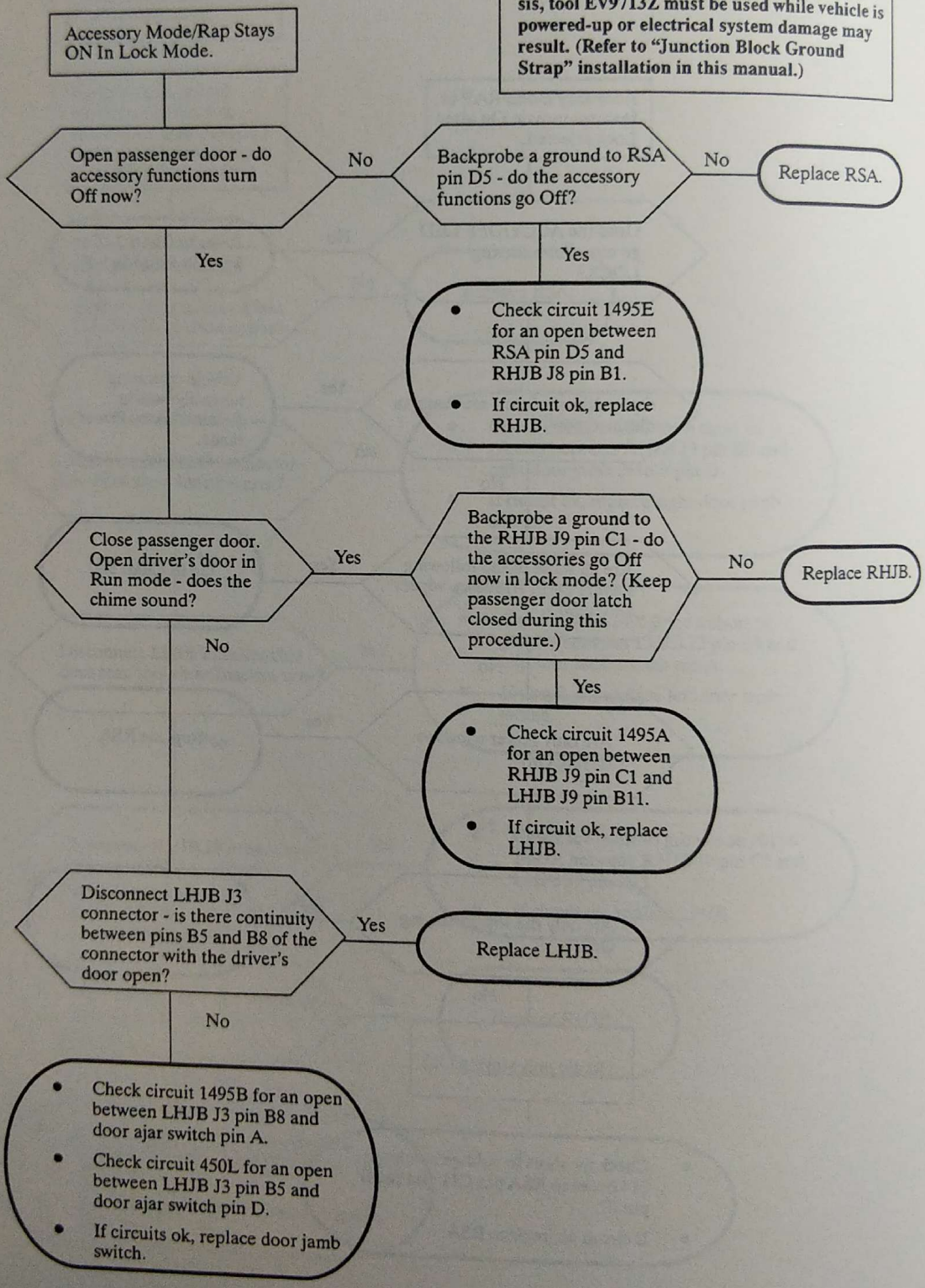
CHART 5



ACCESSORY MODE/RAP STAYS ON IN LOCK MODE

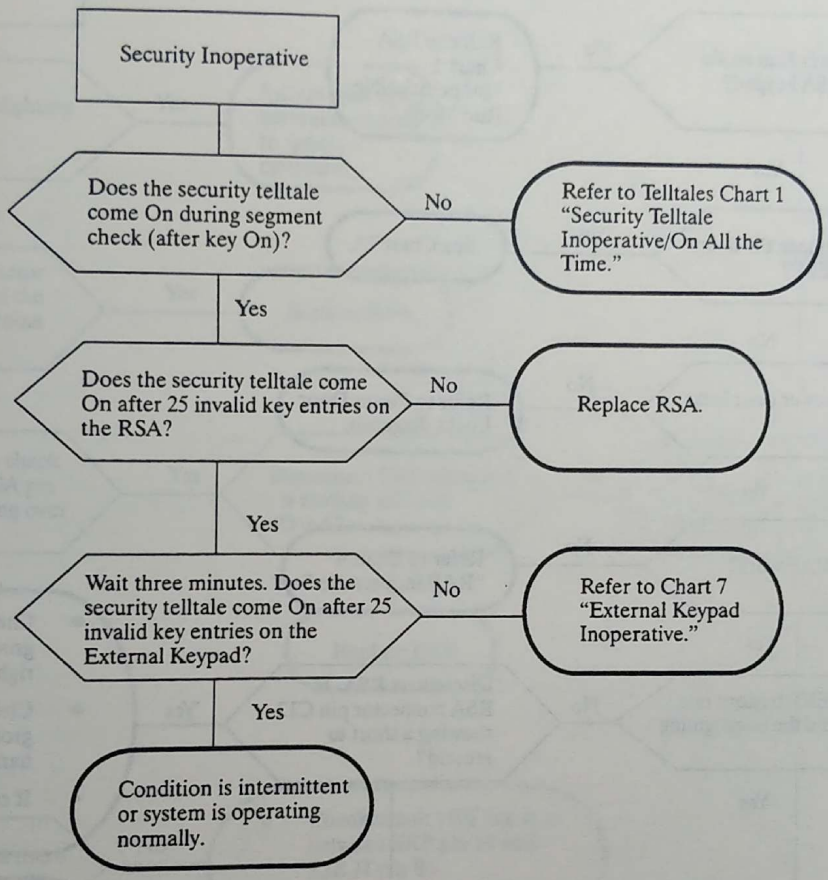
CHART 5A

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



SECURITY INOPERATIVE

CHART 6



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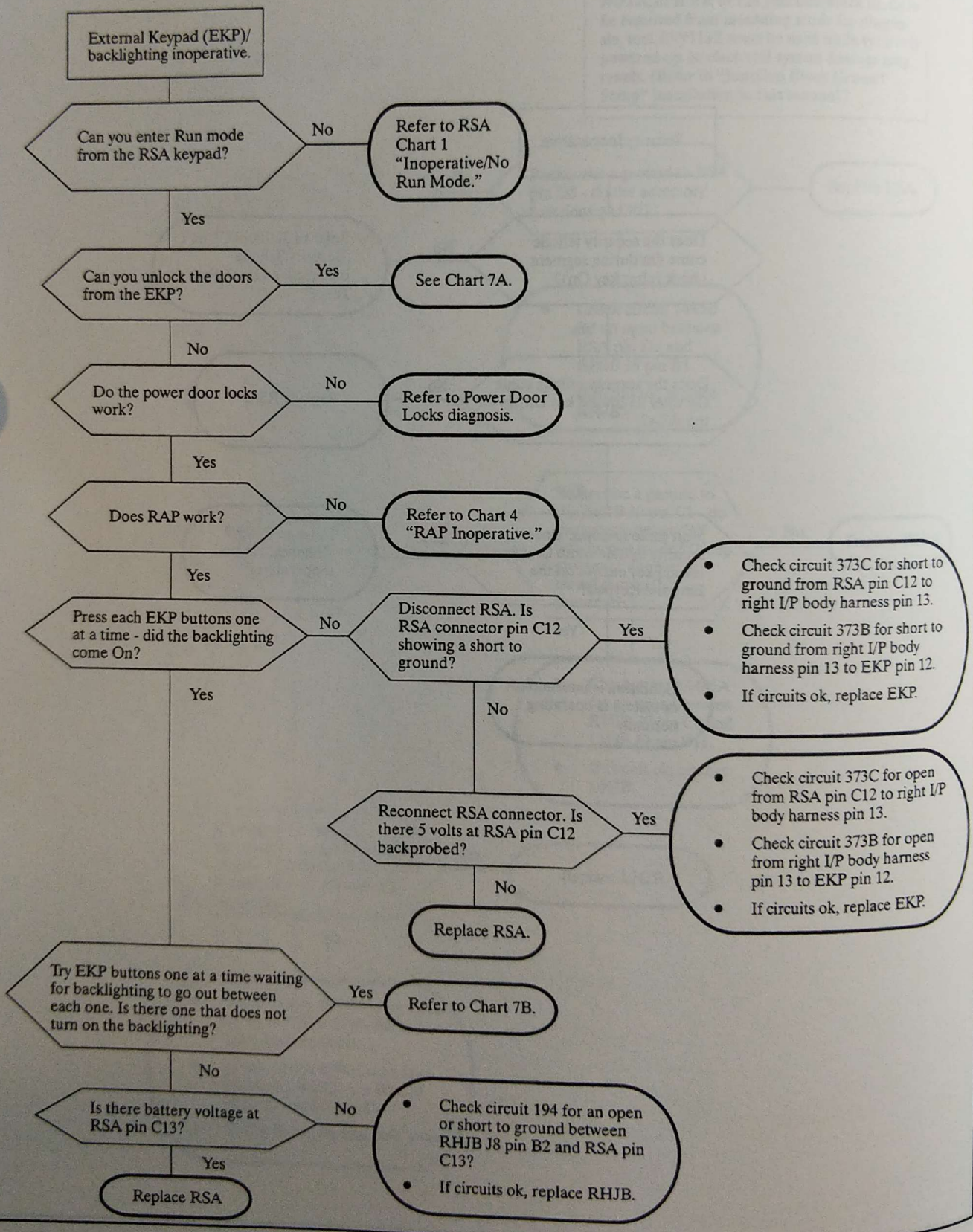
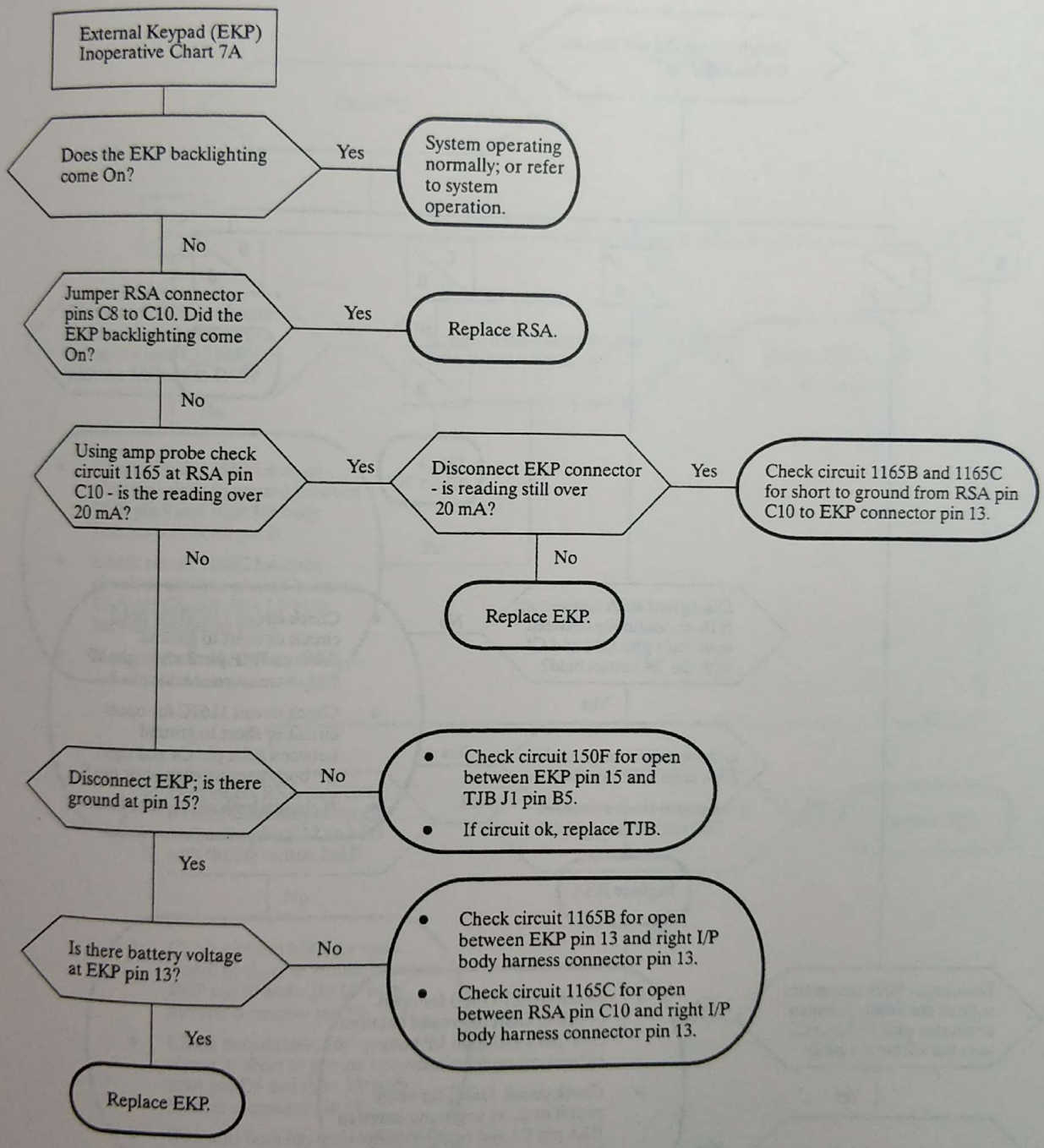
EXTERNAL KEYPAD (EKP)/BACKLIGHTING INOPERATIVE

CHART 7



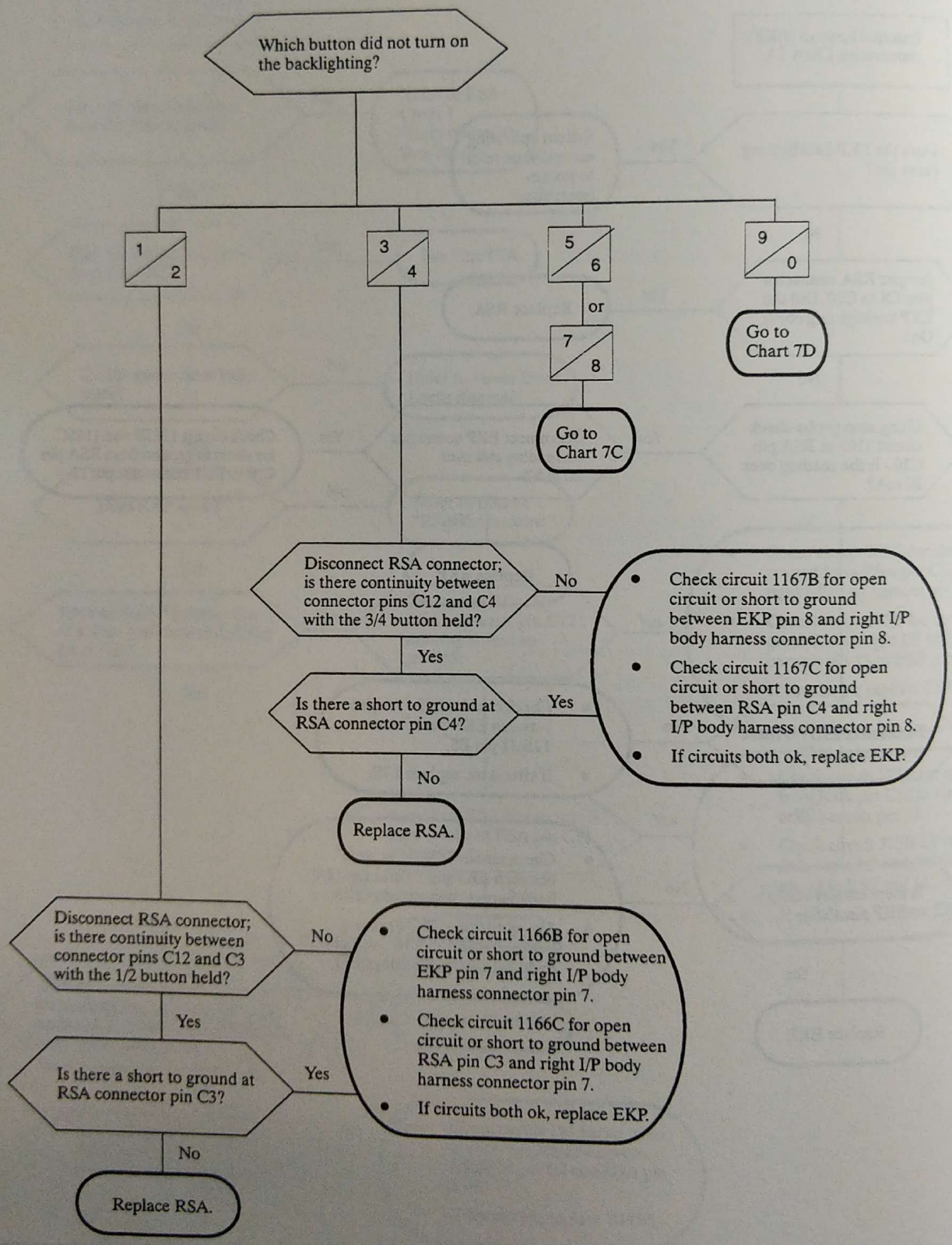
EXTERNAL KEYPAD (EKP) INOPERATIVE

CHART 7A



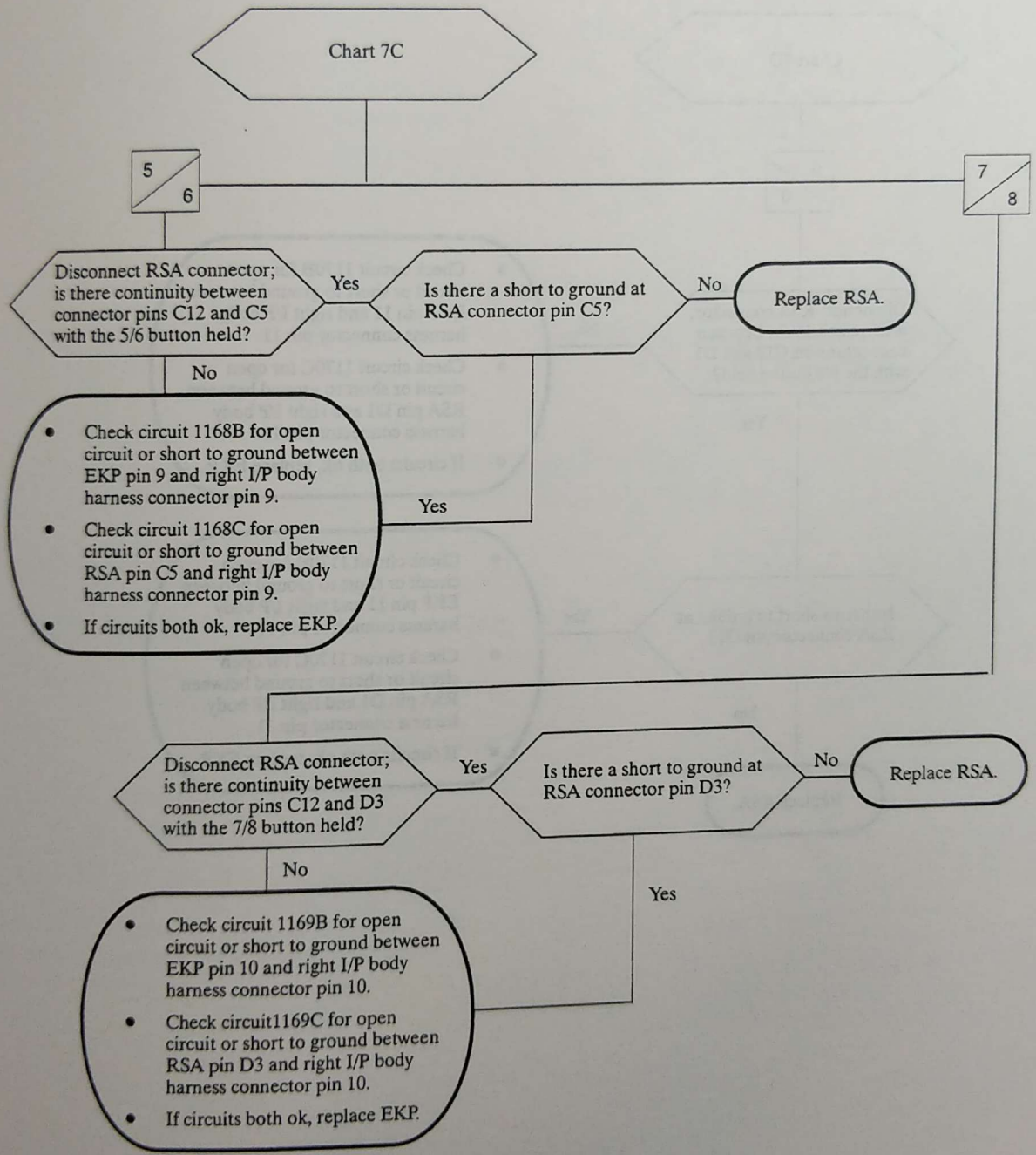
EXTERNAL KEYPAD (EKP) INOPERATIVE (BUTTONS 1/2 OR 3/4)

CHART 7B



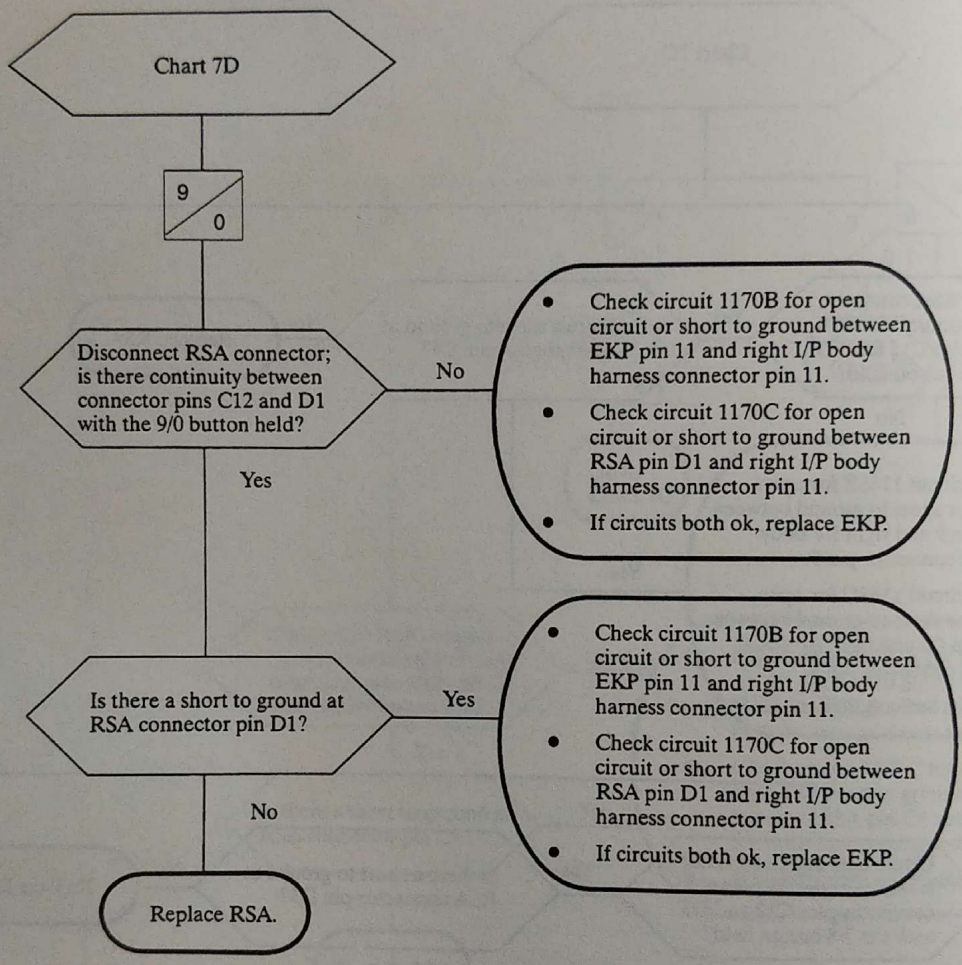
EXTERNAL KEYPAD (EKP) INOPERATIVE (BUTTONS 5/6 OR 7/8)

CHART 7C



EXTERNAL KEYPAD (EKP) INOPERATIVE (BUTTONS 9/0)

CHART 7D



NOTES

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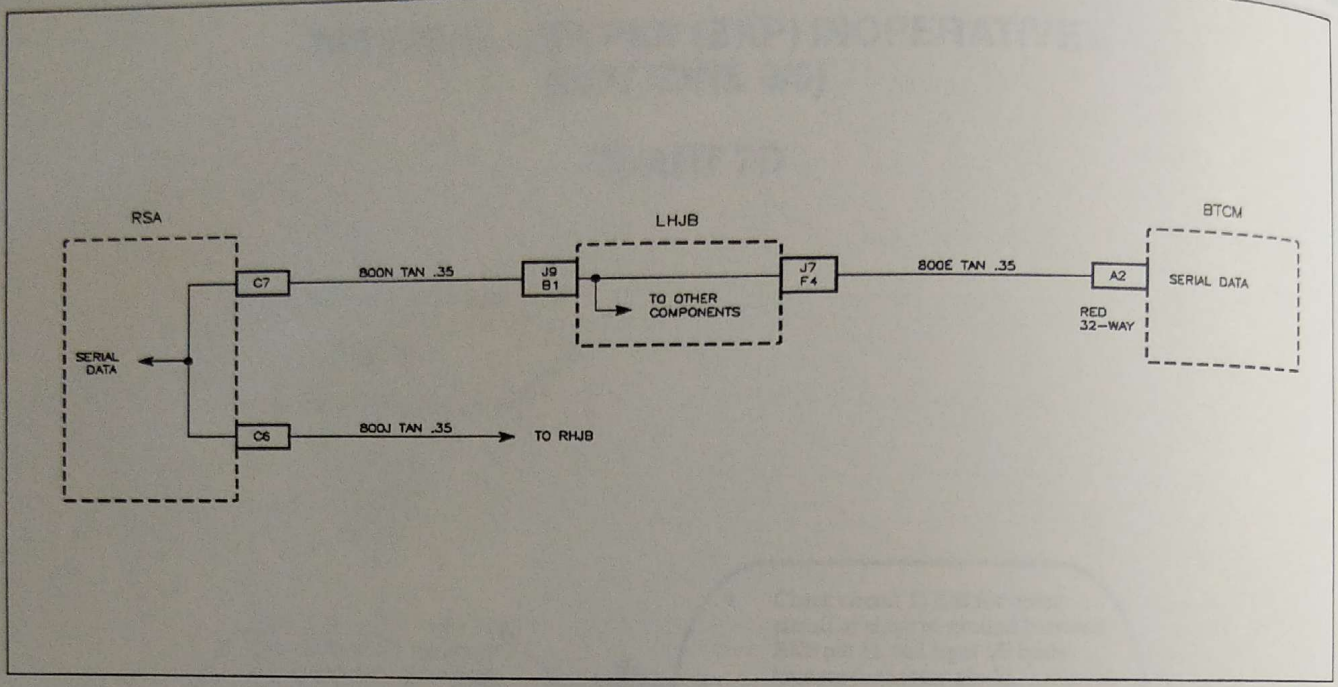
SERIAL DATA LOSS FROM BTCM

DTC 11



PSMELC67937AA

SERIAL DATA LOSS FROM BTCM

The run/lock shifter assembly (RSA) monitors UART communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the RSA loses the brake torque control module (BTCM) eavesdrop message for 14 seconds and no Scan tool or SSS communicaton is taking place.

ACTION TAKEN BY RSA

The check tire pressure monitor remains in its current state and is not updated until communication is restored.

RELATED DTCS

RSA DTC 12 – serial data loss from HTCM
RSA DTC 13 – serial data loss from PCM
BPM DTC 297 – serial data loss from BTCM
PCM DTC 27 – serial data loss from BTCM
IPC DTC 15 – serial data loss from BTCM
and other miscellaneous communications DTCs.

TELLTALE ILLUMINATED

None

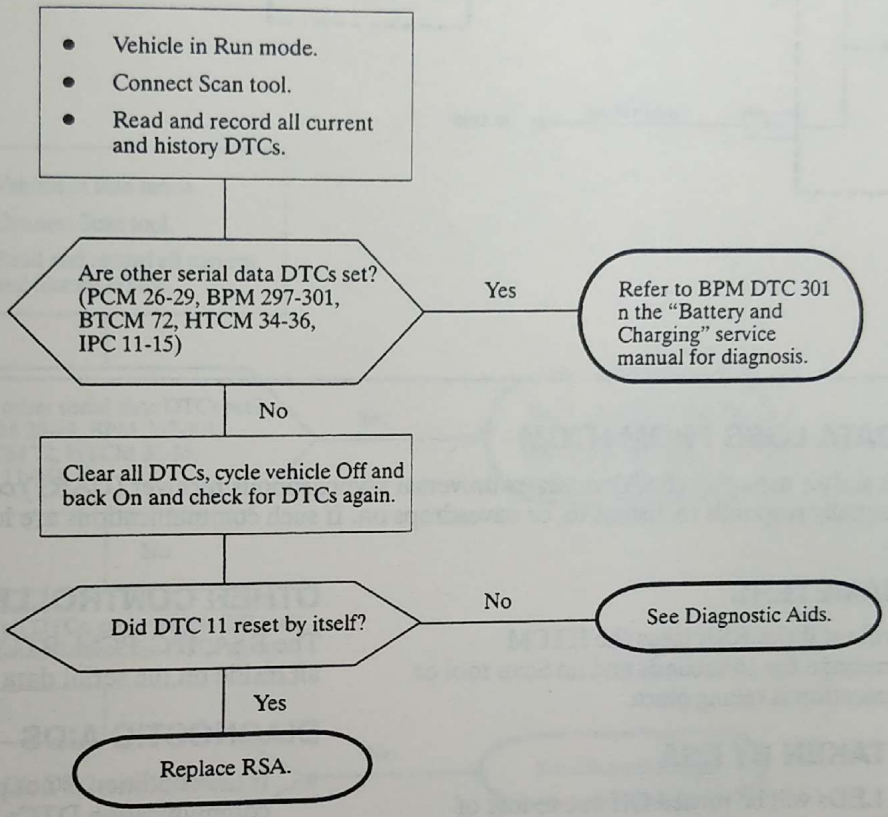
OTHER CONTROLLER INTERFACES

The RSA, IPC, PCM, BTCM, BPM, SDM, and HTCM all reside on the serial data line.

DIAGNOSTIC AIDS

- If the condition is not present, write down all the communication DTCs in history of the following: (PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15). If all DTCs were set, the communication circuit was probably shorted to ground. Refer to BPM DTC 301 in the Battery and Charging service manual for diagnosis.

SERIAL DATA LOSS FROM BTCM



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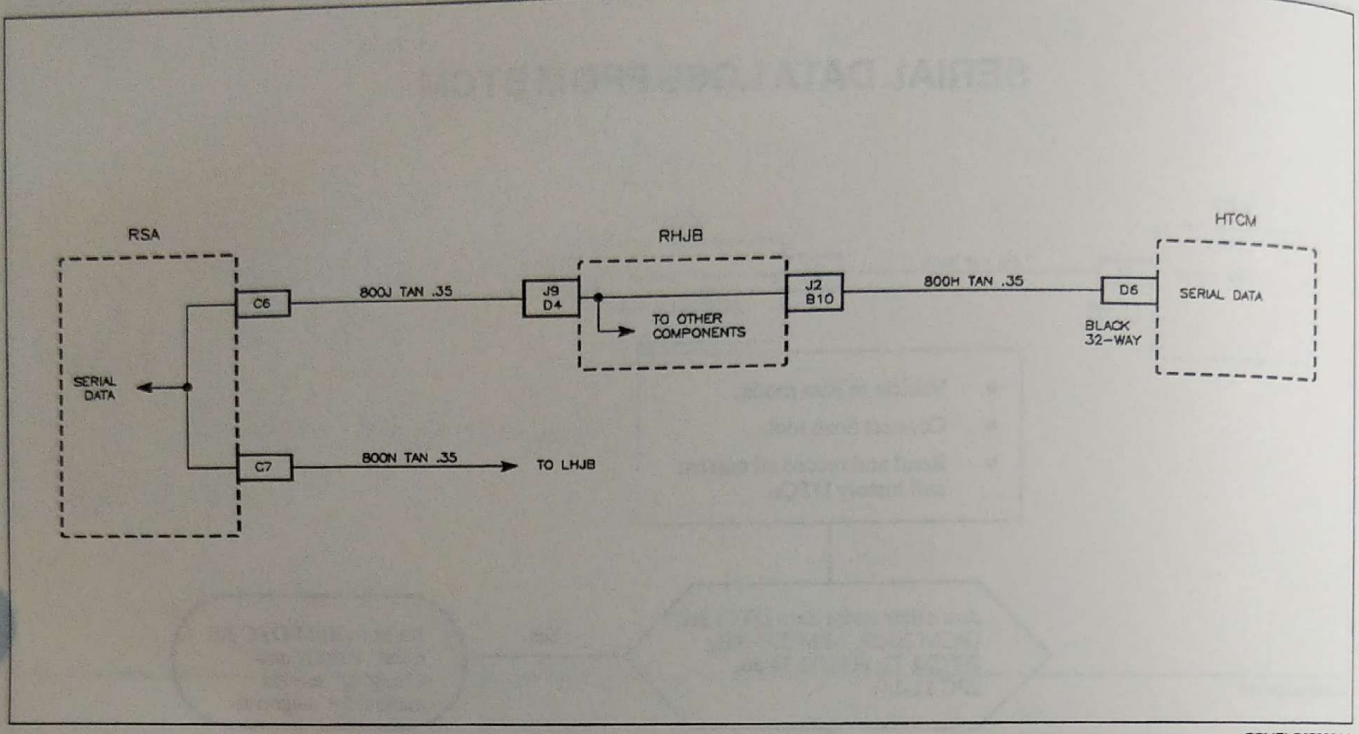
SERIAL DATA LOSS FROM HTCM

DTC 12



PSMELC67938AA

SERIAL DATA LOSS FROM HTCM

The run/lock shifter assembly (RSA) monitors universal asynchronous receiver (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the RSA loses the HTCM eavesdrop message for 14 seconds and no Scan tool or SSS communication is taking place.

ACTION TAKEN BY RSA

The HVAC LEDs will be turned Off due to loss of communication.

RELATED DTCS

RSA DTC 11 – serial data loss from BTCM
RSA DTC 13 – serial data loss from PCM
BPM DTC 300 – serial data loss from HTCM
PCM DTC 29 – serial data loss from HTCM
IPC DTC 13 – serial data loss from HTCM
and other miscellaneous communications DTCs.

TELLTALE ILLUMINATED

None

OTHER CONTROLLER INTERFACES

The RSA, IPC, PCM, BTCM, BPM, SDM, and HTCM all reside on the serial data line.

DIAGNOSTIC AIDS

- If the condition is not present, write down all the communication DTCs in history of the following: (PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15). If all DTCs were set, the communication circuit was probably shorted to ground. Refer to BPM DTC 301 in the Battery and Charging service manual for diagnosis.

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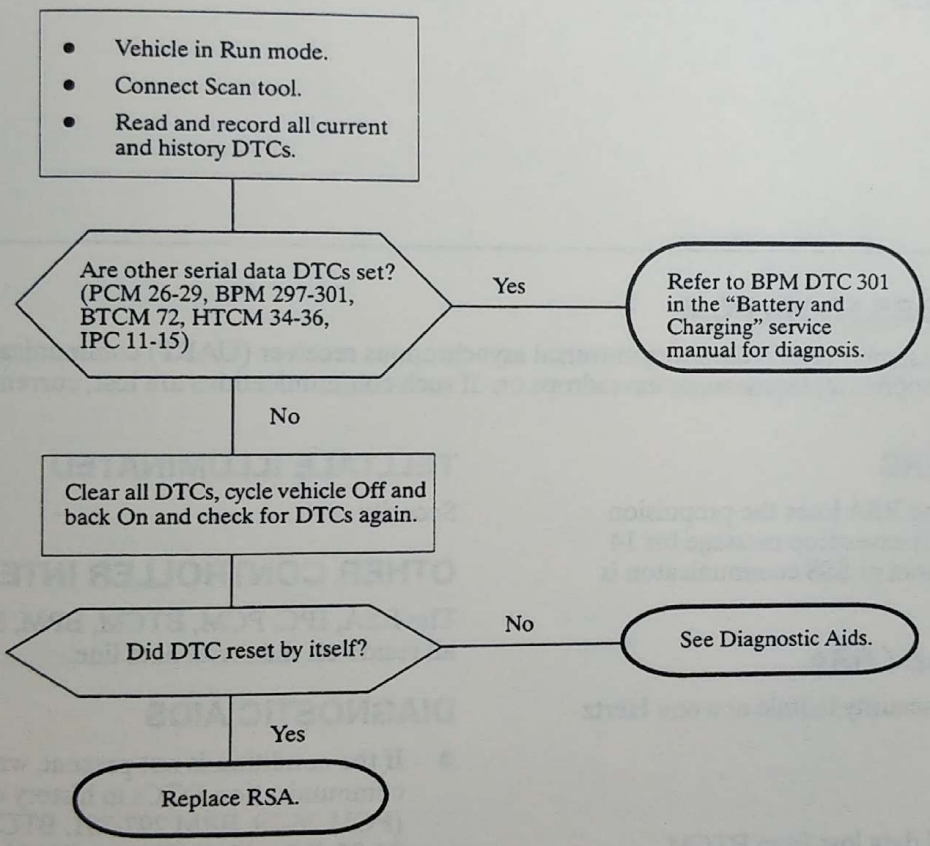
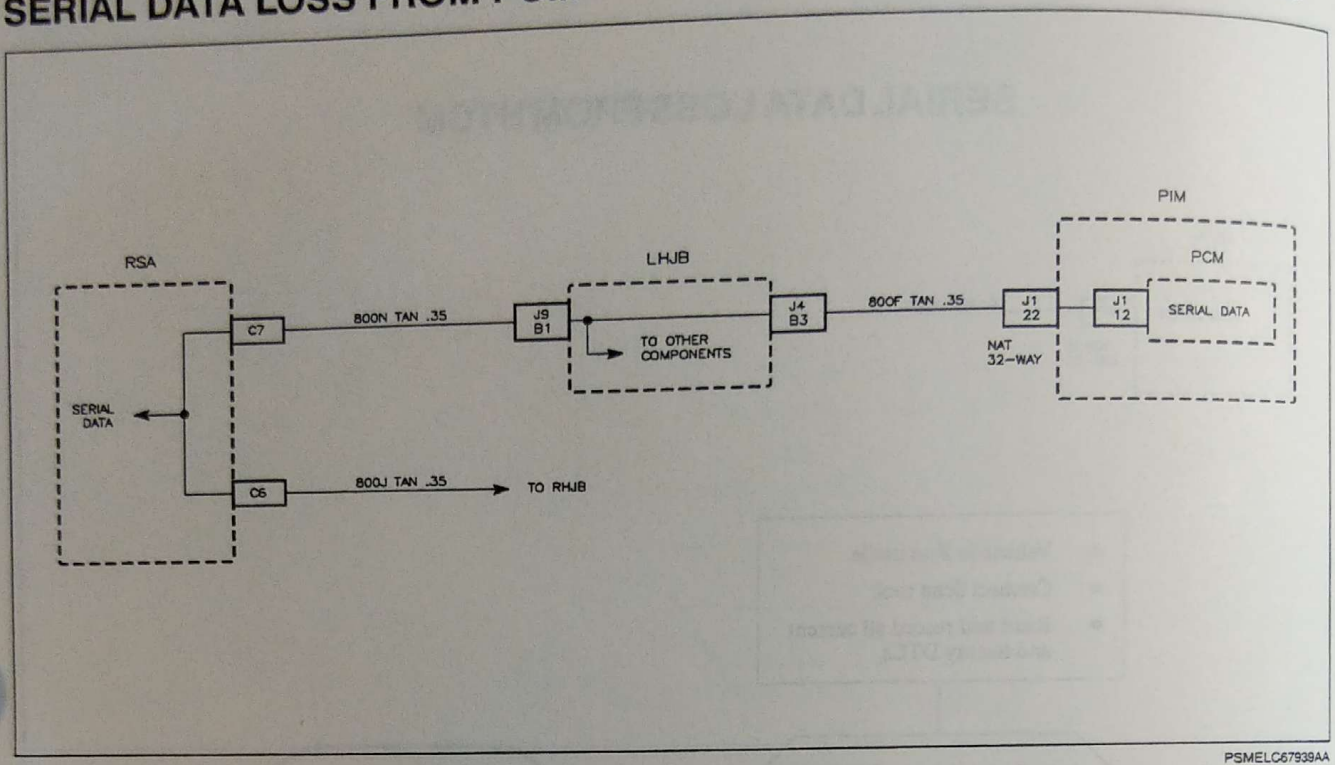
SERIAL DATA LOSS FROM HTCM



SERIAL DATA LOSS FROM PCM

DTC 13



PSMELC67939AA

SERIAL DATA LOSS FROM PCM

The run/lock shifter assembly (RSA) monitors universal asynchronous receiver (UART) communications with the devices it normally responds to, listens to, or eavesdrops on. If such communications are lost, current and history flags are set.

DTC PARAMETERS

This DTC will set if the RSA loses the propulsion control module (PCM) eavesdrop message for 14 seconds and no Scan tool or SSS communicaton is taking place.

ACTION TAKEN BY RSA

The RSA toggles the security telltale at a one Hertz rate.

RELATED DTCS

RSA DTC 11 – serial data loss from BTCM
RSA DTC 12 – serial data loss from HTCM
BPM DTC 301 – serial data loss from PCM
HTCM DTC 35 – serial data loss from PCM
BTCM DTC 72 – serial data loss from PCM
IPC DTC 12 – serial data loss from PCM
and other miscellaneous communications DTCs.

TELLTALE ILLUMINATED

Security

OTHER CONTROLLER INTERFACES

The RSA, IPC, PCM, BTCM, BPM, SDM, and HTCM all reside on the serial data line.

DIAGNOSTIC AIDS

- If the condition is not present, write down all the communication DTCs in history of the following: (PCM 26-29, BPM 297-301, BTCM 72, HTCM 34-36, RSA 11-13, IPC 11-15). If all DTCs were set, the communication circuit was probably shorted to ground. Refer to BPM DTC 301 in the Battery and Charging service manual for diagnosis.

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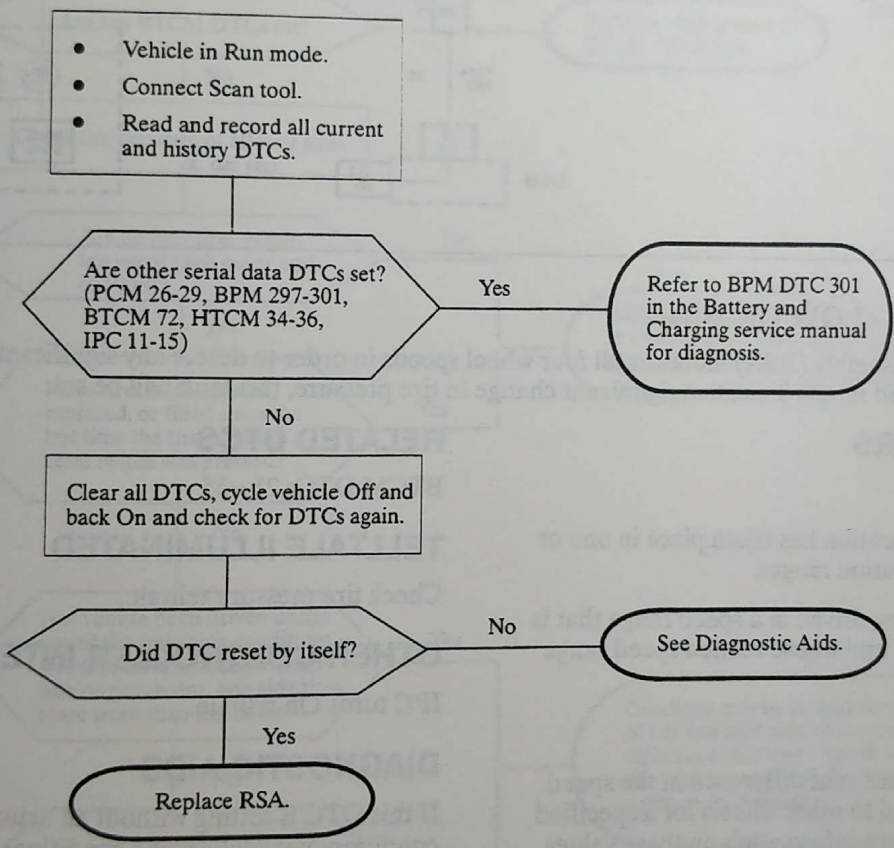
SERIAL DATA LOSS FROM PCM



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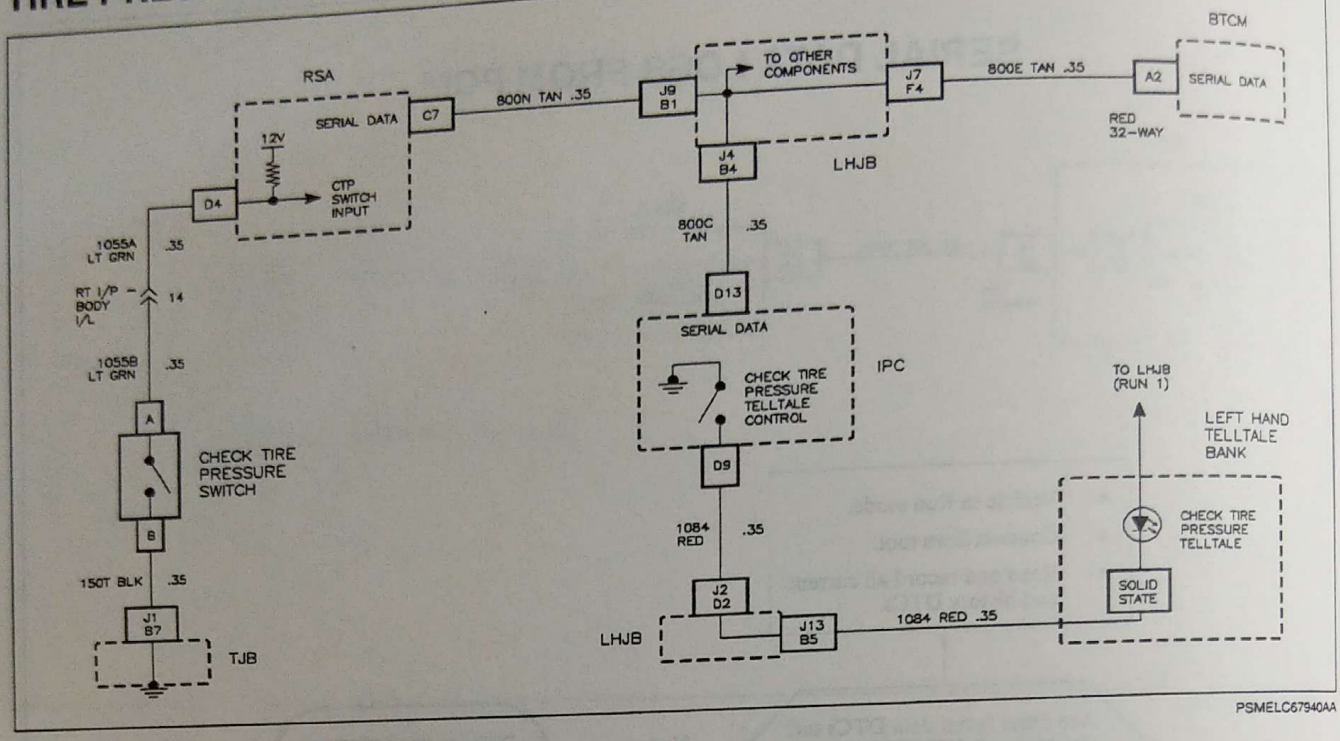
TIRE PRESSURE – LOW OR HIGH



PSMELC67940AA

TIRE PRESSURE - LOW OR HIGH

The run/lock shifter assembly (RSA) monitors all four wheel speeds in order to detect any significant changes in tire pressure. If wheel speed inputs indicate a significant change in tire pressure, this fault will be set.

DTC PARAMETERS

DTC 23 will set if:

- Wheel speed calibration has taken place in one or more of the calibration ranges.
- The vehicle is being driven in a speed range that is already calibrated and whose related speed range are calibrated.

DTC 23 will set when:

The RSA detects a significant difference in the speed of one wheel compared to other wheels for a specified period of time. For more information on these values refer to check tire pressure system in this service manual.

FAILURE ACTION

Turns On telltale.

RELATED DTCS

BTCM DTCs 21–35

TELLTALE ILLUMINATED

Check tire pressure telltale.

OTHER CONTROLLER INTERFACES

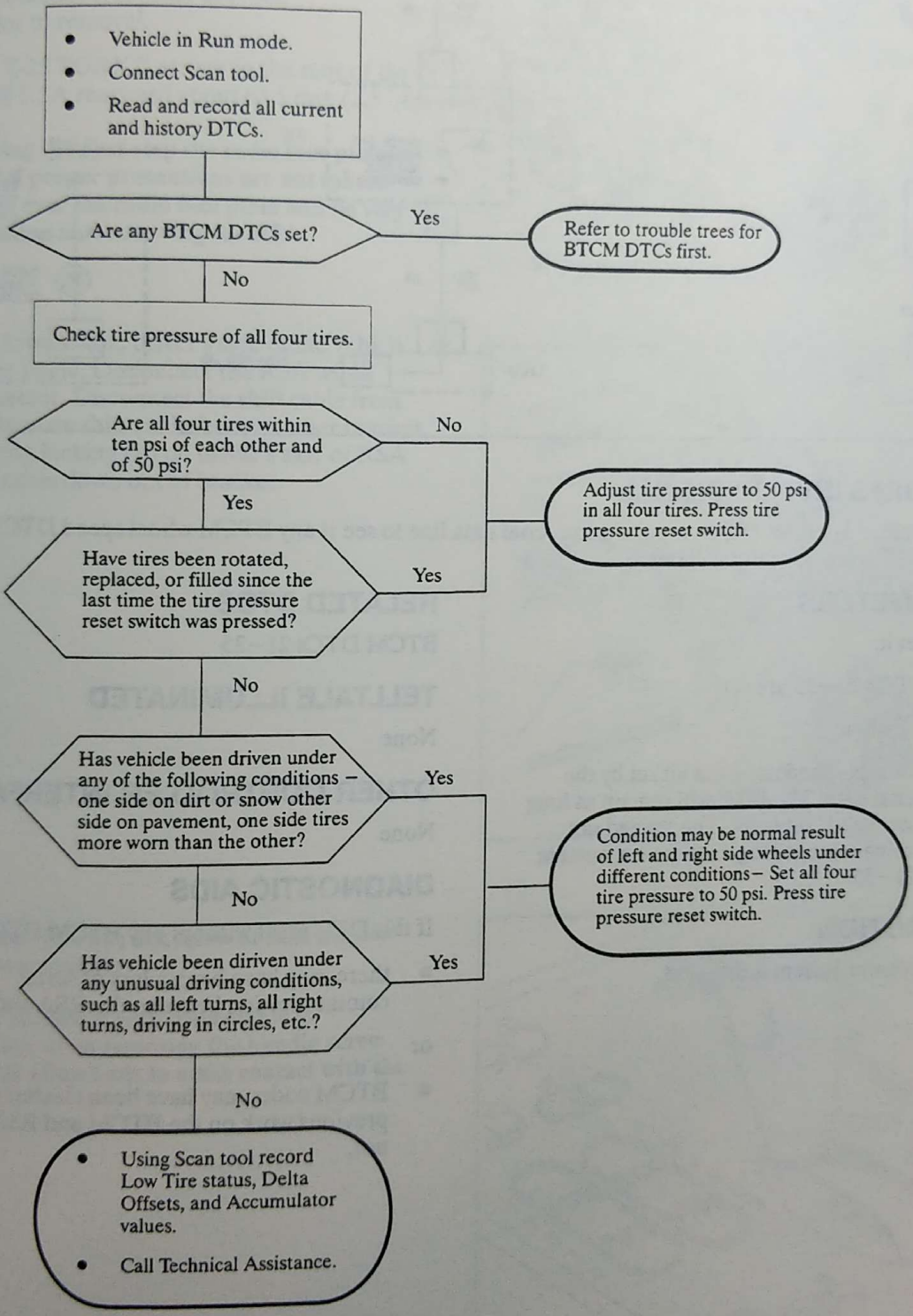
IPC turns On telltale.

DIAGNOSTIC AIDS

If this DTC is setting without an actual low tire condition, unusual driving conditions is the most likely cause. It is important to get as much information from the customer as possible regarding the driving conditions around the time the light came on. It is also important to find out what the driving conditions were during the first few trips after the last check tire pressure system (CTPS) reset.

Any conditions that affect the speed of the wheels on one side of the vehicle differently from the other side can lead to false DTC 23's.

TIRE PRESSURE - LOW OR HIGH



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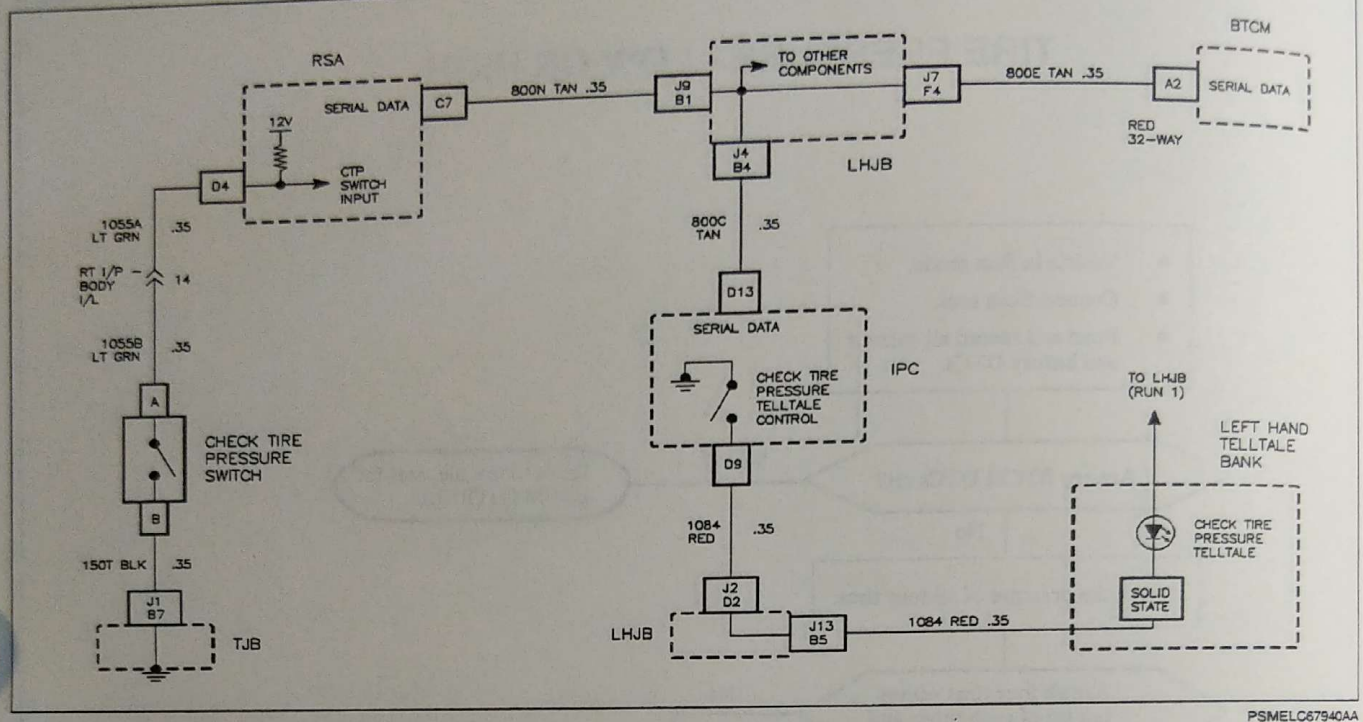
TIRE REPORTS INVALID SIGNAL

DTC 33



PSMELC67940AA

TIRE REPORTS INVALID SIGNAL

The run/lock shifter assembly (RSA) monitors the serial data line to see if any BTCM wheel speed DTC's set. If any wheel speed DTC's set, this fault will be set.

DTC PARAMETERS

DTC 33 will set if:

Any BTCM DTC's 21–35 are set.

DTC 33 will set when:

The RSA sees wheel speed not valid bit set by the BTCM over serial data. The DTC will remain as long as the "speed not valid" bit is set. The "speed not valid" bit will remain set as long as there is a current BTCM DTC 21–35.

FAILURE ACTION

Check Tire Pressure System is disabled.

RELATED DTCS

BTCM DTCs 21–35

TELLTALE ILLUMINATED

None

OTHER CONTROLLER INTERFACES

None

DIAGNOSTIC AIDS

If this DTC is set without any BTCM DTCs set:

- there may have been a loss of serial communication between the RSA and the BTCM.

or

- BTCM codes may have been cleared during previous work on the BTCM and RSA codes were not.

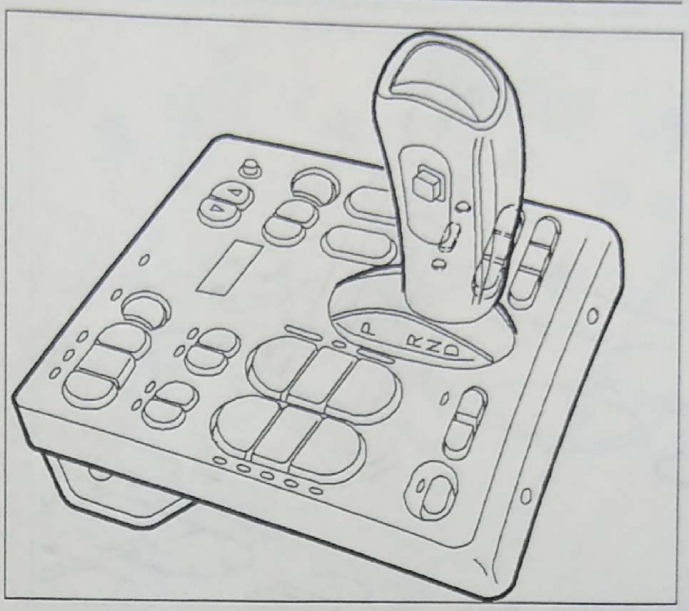
RUN/LOCK SHIFTER ASSEMBLY TRIMPLATE (RSA TRIMPLATE)

REMOVAL

IMPORTANT: If the RSA is being replaced and is being sent back to manufacturer, set user keycode to 1, 1, 1, 1, 1 prior to removal.

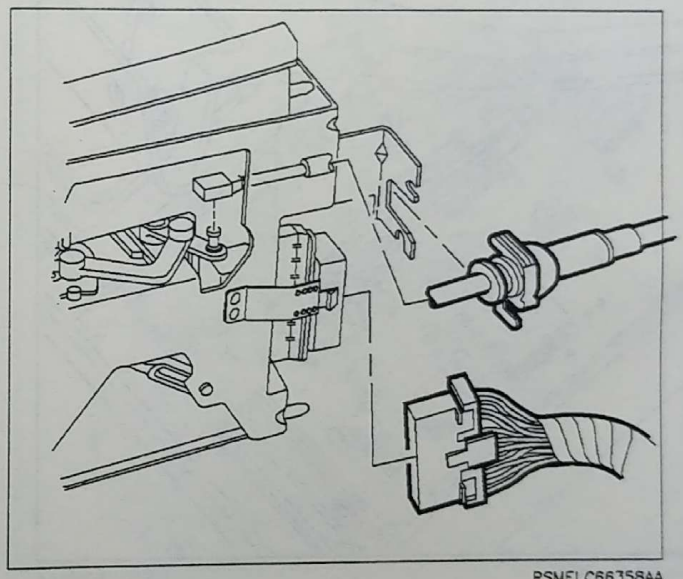
1. Remove the T-25 TORX™ screws in the rear of the RSA and pull RSA rearward about 63.5 mm (2.5 in.).

NOTICE: During the next step the radio face plate may be damaged if proper precautions are not taken. Place a drop cloth over the radio face plate and be very careful while rotating and removing the RSA.



PSMELC66357AA

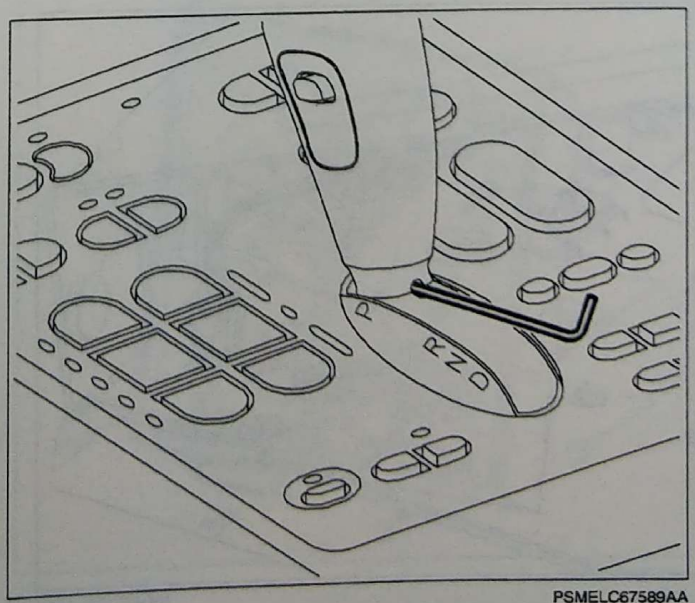
2. Rotate RSA towards the driver's side of the vehicle to a 45 degree angle. Disconnect the RSA wire harness connector. Disconnect the shift cable from the shifter. Remove shift cable from retainer bracket by gently prying locking tab on driver's side of RSA and pushing cable down out of bracket.



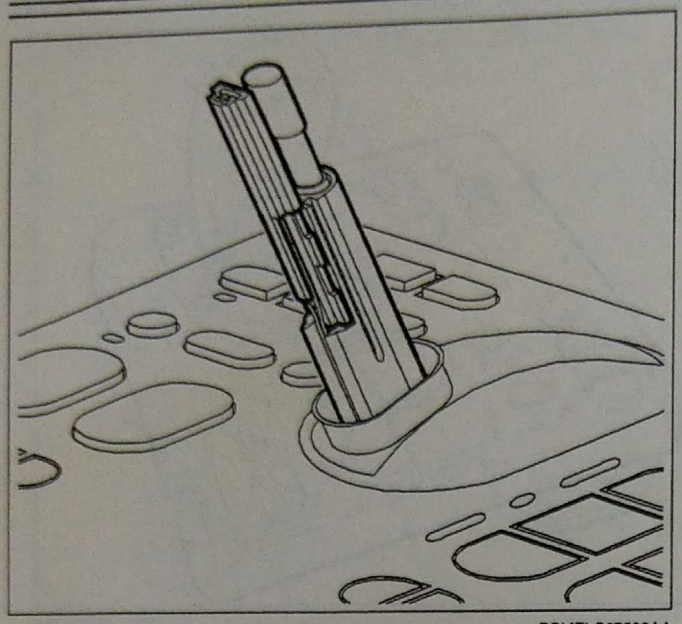
PSMELC66358AA

3. Remove 3.2 mm (1/8 in.) hex screw at shift handle base and remove handle

NOTICE: RSA surface is very susceptable to scratching. Use care when removing the handle screw and handle. Do not allow tools to make contact with the surface.

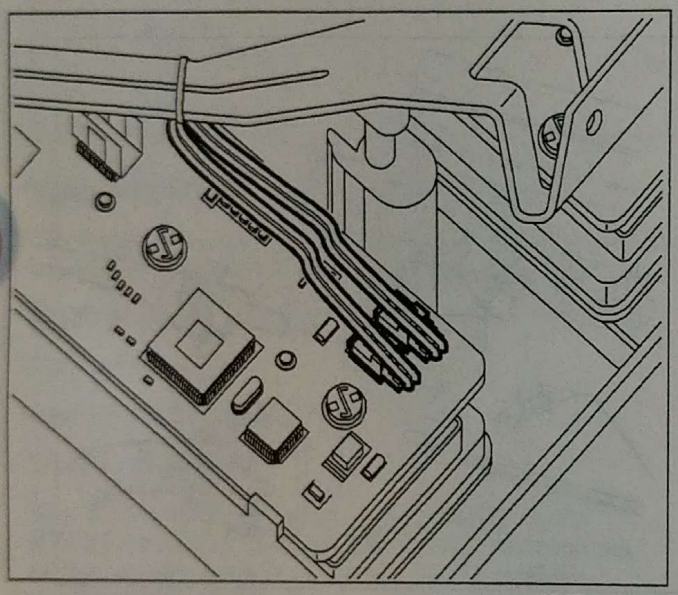


PSMELC67589AA



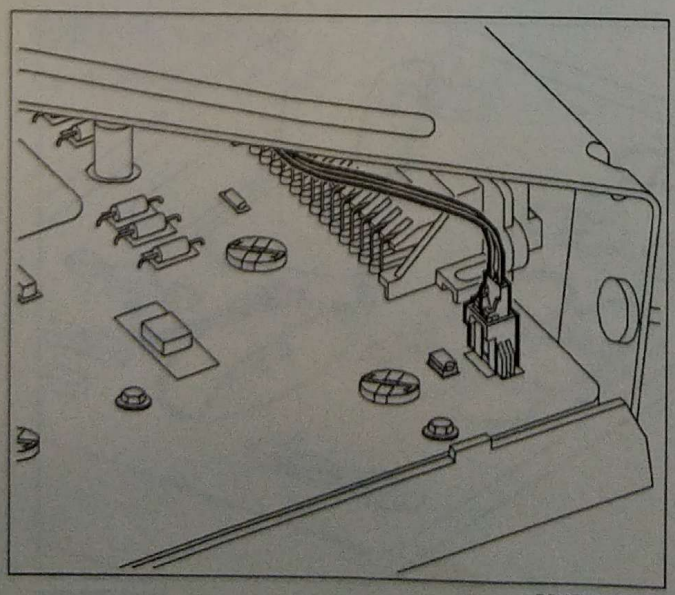
PSMELC67590AA

4. Remove metal guide from RSA.



PSMELC67591AA

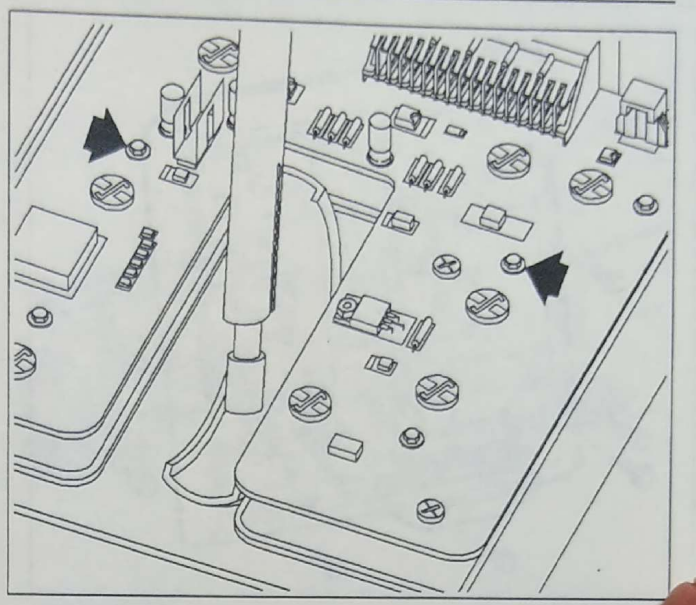
5. Turn RSA over and disconnect front electrical connectors from RSA circuit board.



PSMELC67592AA

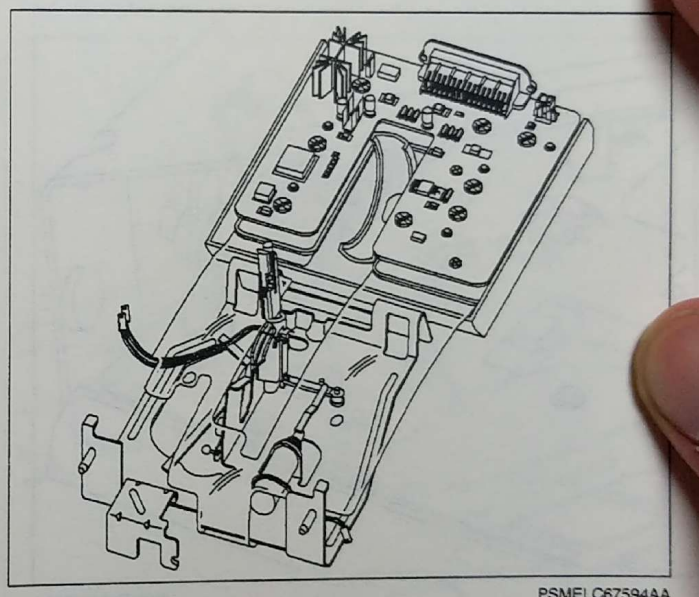
6. Disconnect solenoid connector from circuit board.

7. Loosen bolts retaining electrostatic discharge (ESD) shield enough to release shield from circuit board.



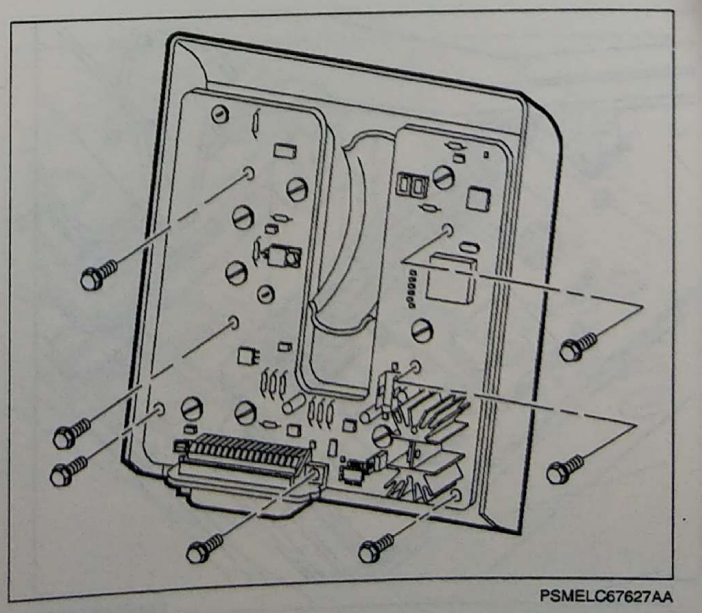
PSMELC67593AA

8. Unfold RSA bracket away from rest of assembly and lay out on a clean surface.



PSMELC67594AA

9. Unscrew seven RSA board screws and remove board and shield from RSA faceplate.



PSMELC67627AA

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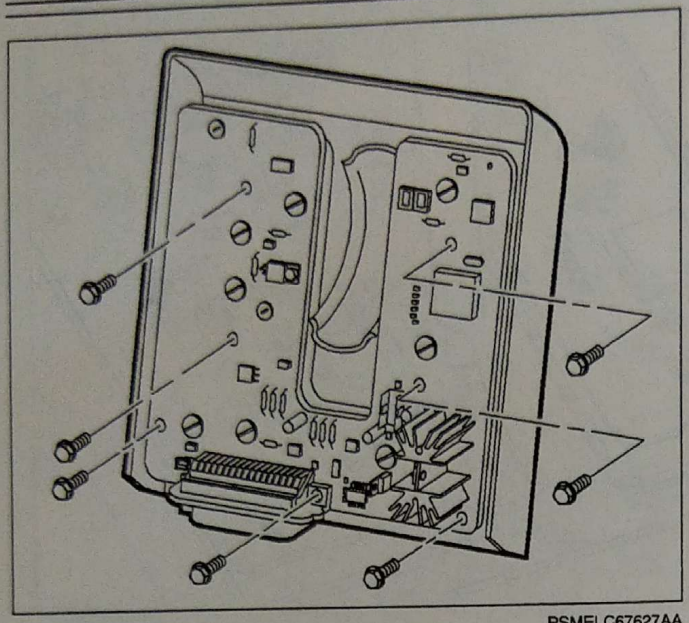
INSTALLATION

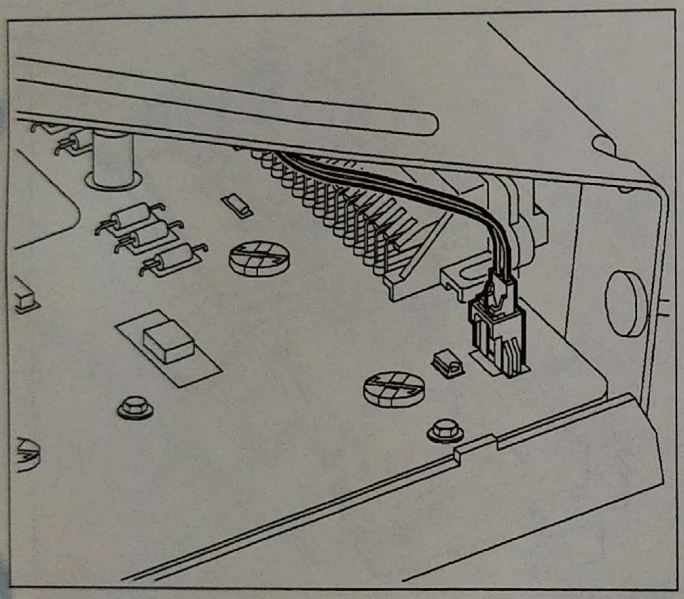
1. Replace RSA board and shield on new RSA faceplate and install seven screws.

Torque: 2 N•m (18 in-lbs)



PSMELC67627AA

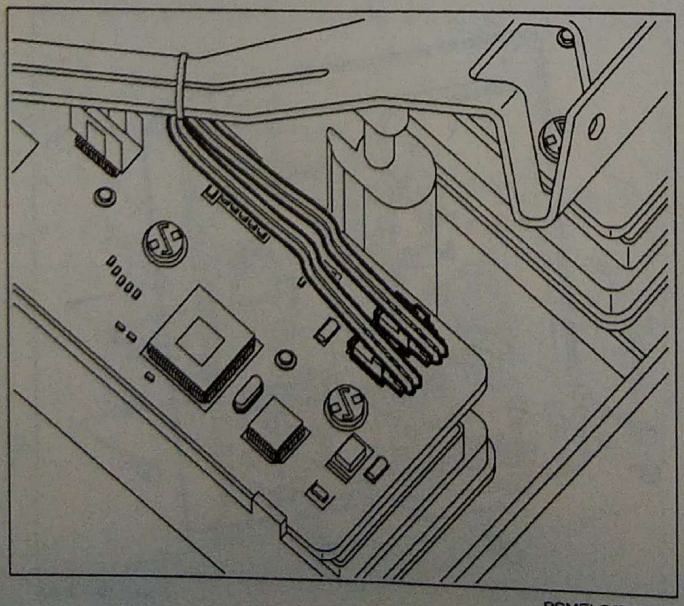
2. Fold RSA bracket back into rest of assembly and install RSA frame to board and faceplate and reconnect solenoid connector.



PSMELC67592AA

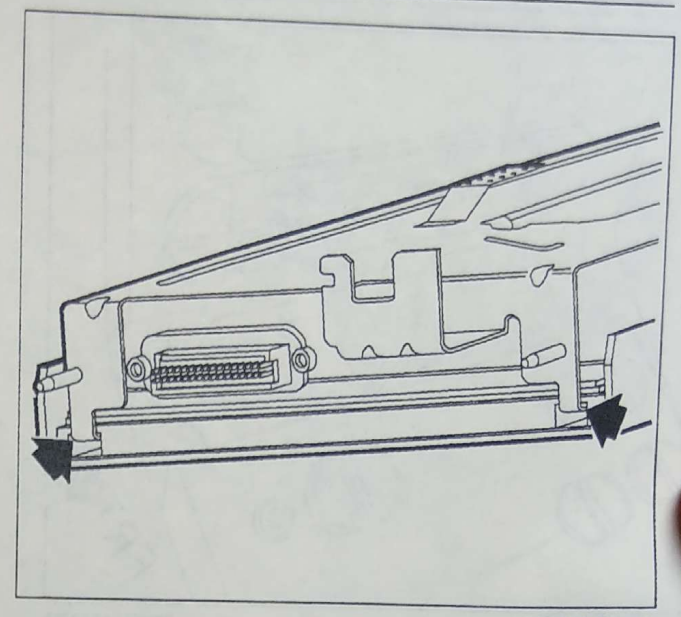
3. Reconnect other two connectors.

NOTICE: Make sure white connector is on the side of the shift handle.



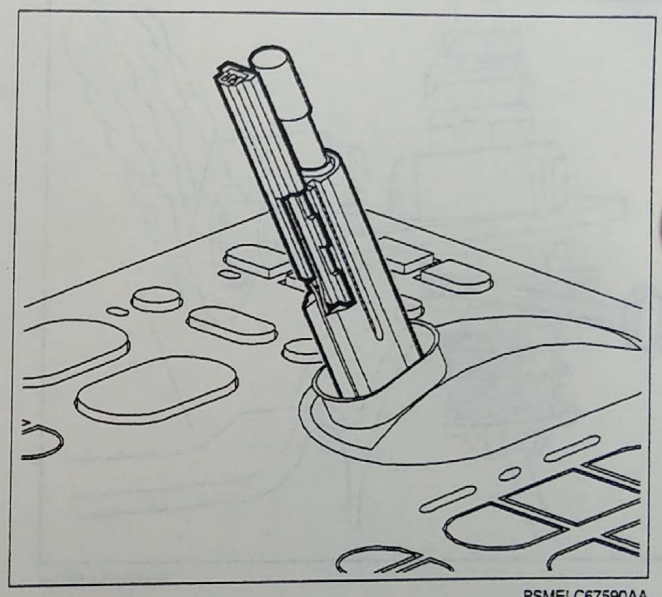
PSMELC67591AA

4. Make certain bracket tabs are in the detents provided. Position frame against the rest of the assembly and place RSA right side up.



PSMELC67628AA

5. Install metal guide onto shifter rode. Position connector jumper in groove.

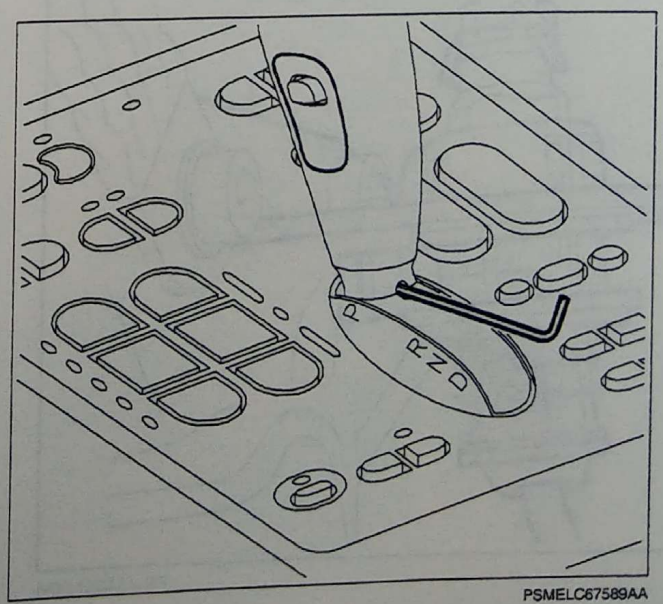


PSMELC67590AA

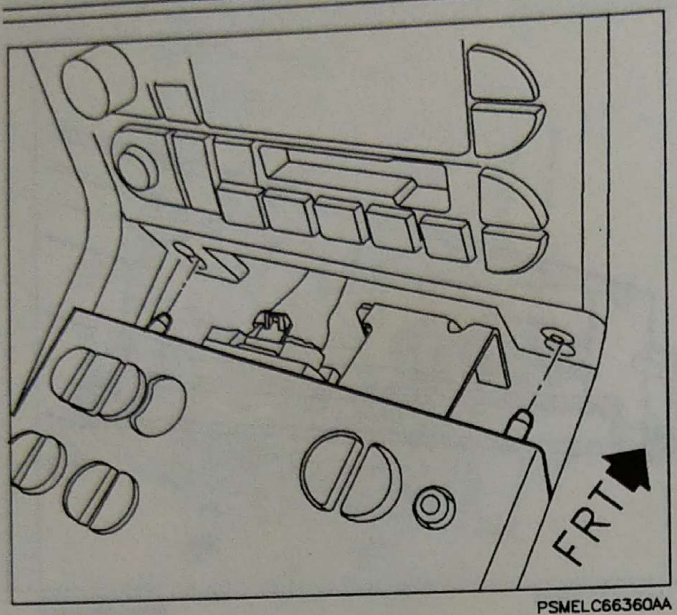
6. Install shift handle. Install and tighten hex screw.

Torque: 2.8 N•m (25 in-lbs)

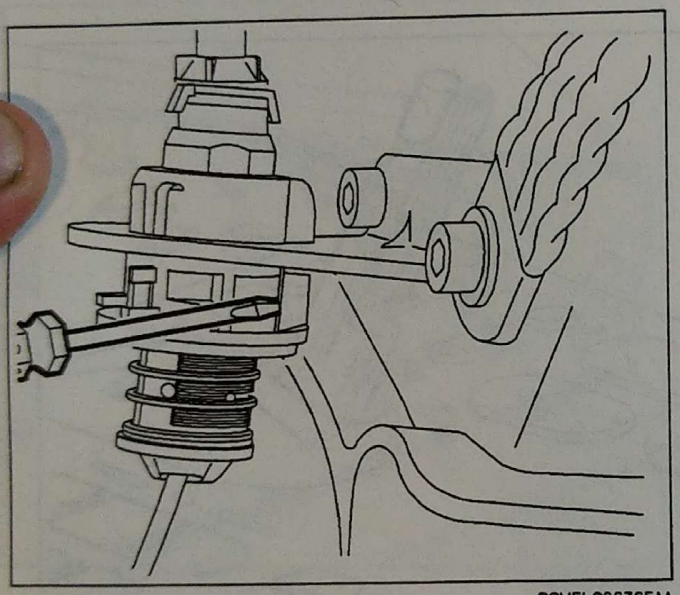
NOTICE: RSA surface is very susceptable to scratching. Use care when removing the handle screw and handle. Do not allow tools to make contact with the surface.



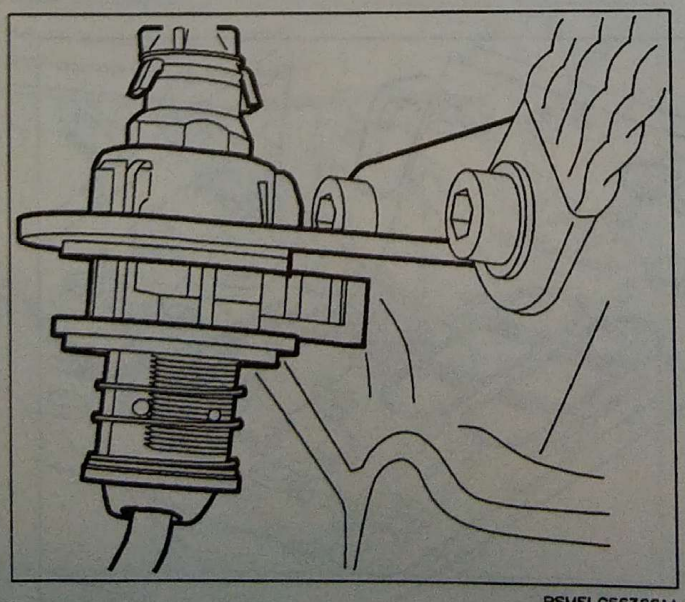
PSMELC67589AA



PSMELC66360AA



PSMELC66365AA



PSMELC66366AA

7. Install shift cable housing into shift bracket. Connect and secure shift cable to shifter. Be sure clip lock tab is in place. Connect wire harness connector to run/lock shifter assembly (RSA).

NOTICE: Check the shift cable retention to the RSA ball socket. If the shift cable is not retained securely, replace the shift cable. If the shift cable is not retained securely it could pop off during operation resulting in loss of shifter control.

8. Align RSA locator tabs to front of IPC. and push down on the rear of the RSA. Install torx fasteners.

Torque: 6 N•m (53 in−lbs)

NOTICE: If RSA has been removed you must adjust shift cable at transaxle.

9. Adjust shift cable:
   The shift cable must be attached to the RSA with the RSA secured in position. Shift handle must be placed in neutral before cable adjustment can be performed.
10. Remove front air deflector. (Refer to "Underbody Front Air Deflector" removal procedure in this manual.)
11. Unlock u-shaped adjustment collar. Collar is located aft of drive unit bracket, and will unlock by inserting a pocket screwdriver into gap and prying towards drive unit.

IMPORTANT: About 12.7 mm (1/2 in.) movement necessary to insure unlock position.

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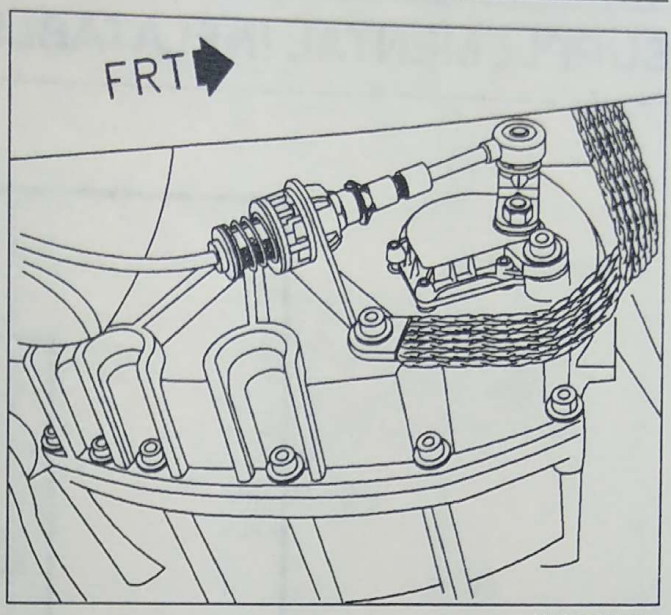
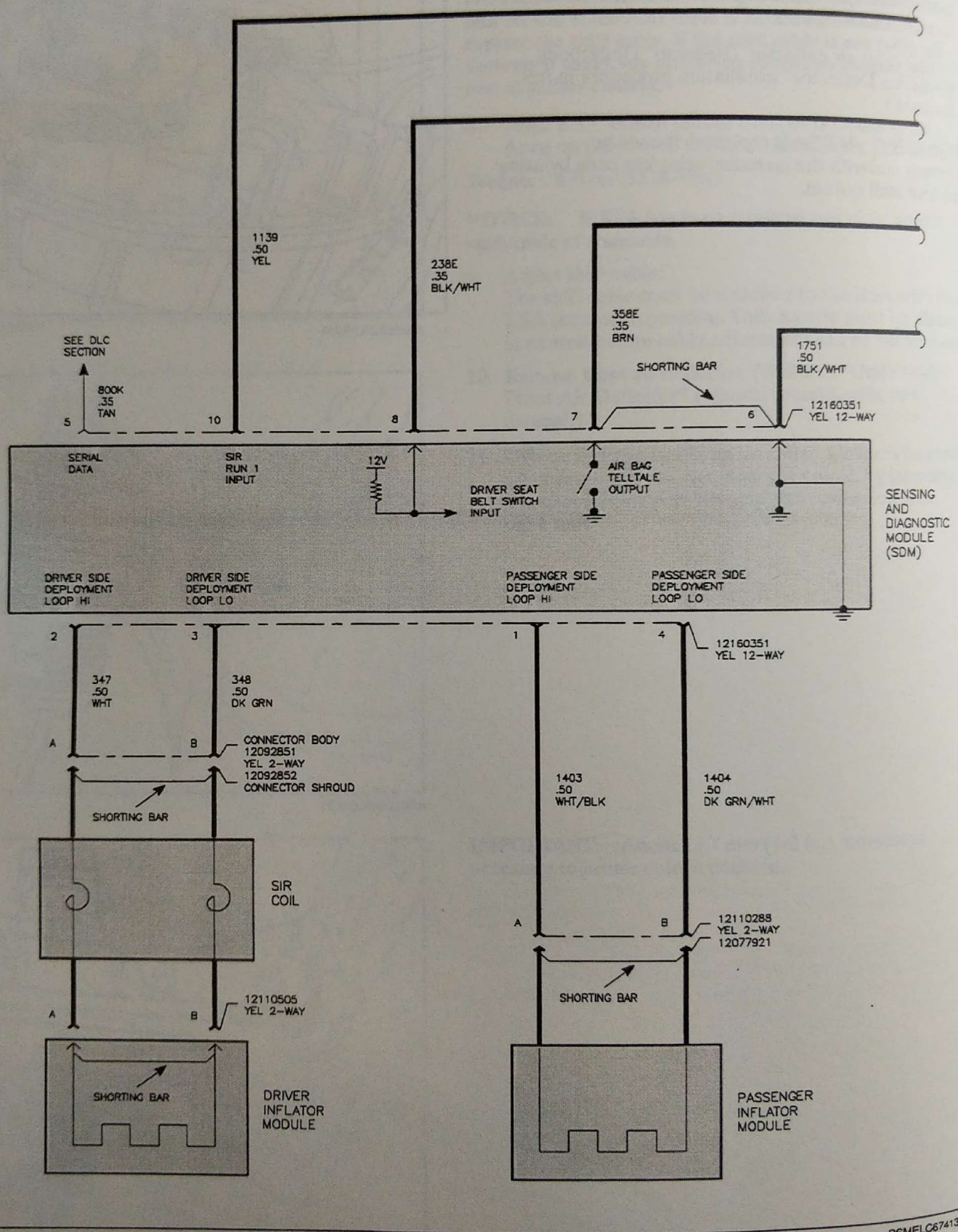
12. Verify shift lever is in neutral.
13. By hand shift park/lock lever lever to the full counter-clockwise position (drive) then move one detent in the clockwise direction (neutral)). Push u-shaped collar into lock position. Collar will move to right side of vehicle.
14. Install front air deflector. (Refer to "Underbody Front Air Deflector" installation procedure in this manual.)

IMPORTANT: If RSA is replaced, it must be reprogrammed with the manufacturing key code by using the service stall system.

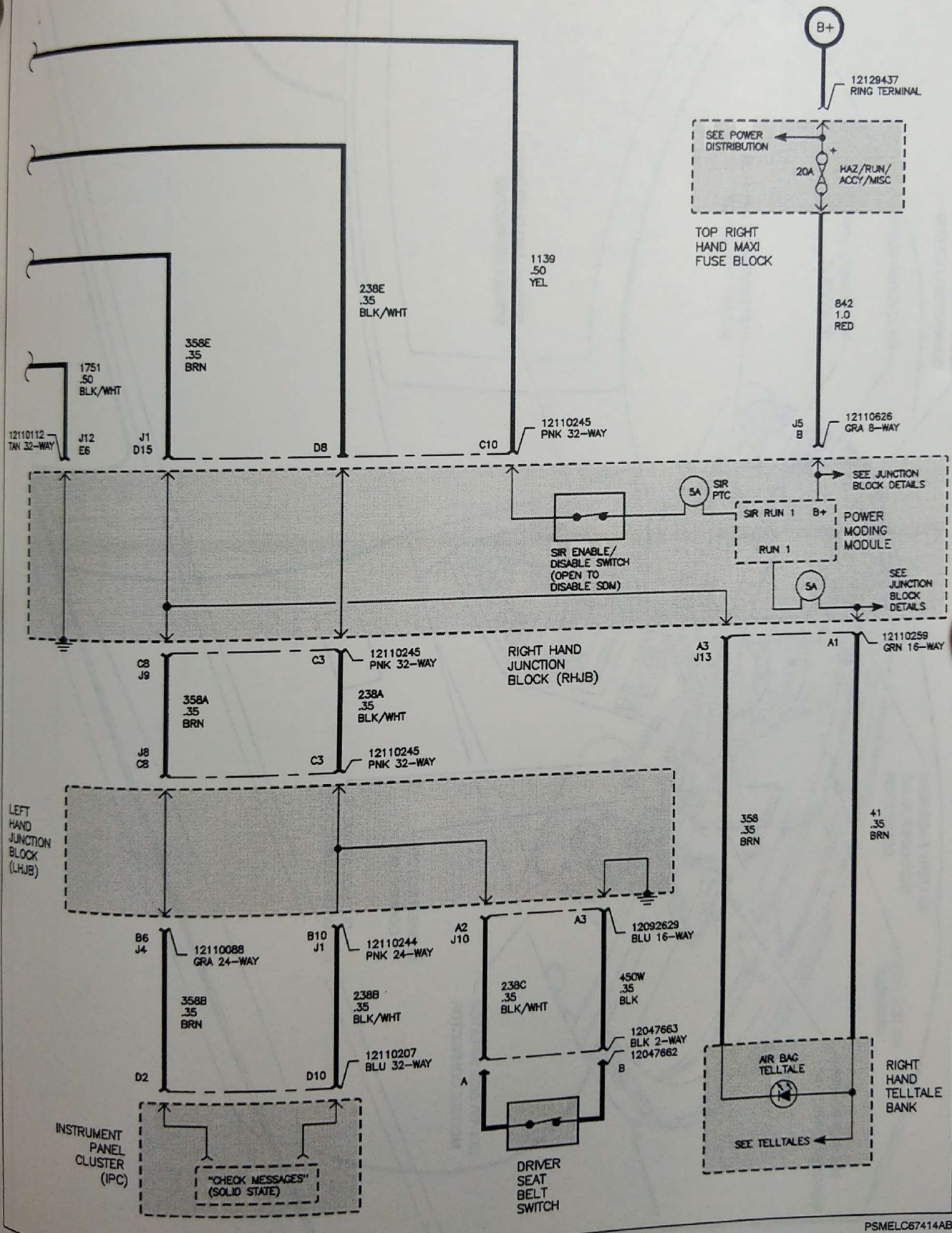


PSMELC66364AA

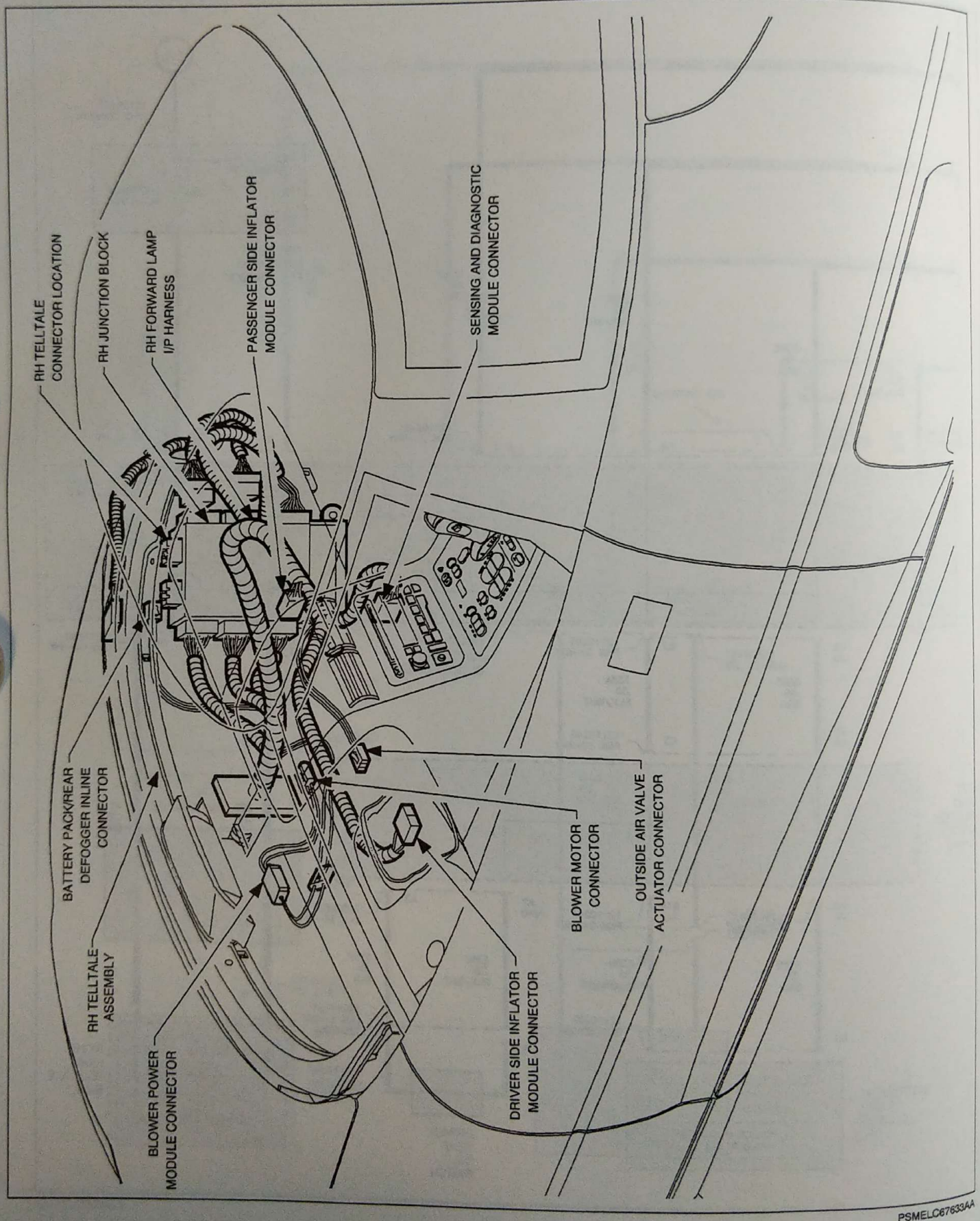
SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM



PSMELC67413AB


B+
12129437
RING TERMINAL
SEE POWER DISTRIBUTION
20A
HAZ/RUN/ ACCY/MISC
TOP RIGHT HAND MAXI FUSE BLOCK
842
1.0
RED
J5
B
12110626
GRA 8–WAY
1139
.50
YEL
238E
.35
BLK/WHT
358E
.35
BRN
1751
.50
BLK/WHT
12110112
TAN 32–WAY
J12
E6
J1
D15
D8
C10
12110245
PNK 32–WAY
SEE JUNCTION BLOCK DETAILS
5A
SIR
PTC
SIR RUN 1
B+
POWER MODING MODULE
RUN 1
SIR ENABLE/ DISABLE SWITCH (OPEN TO DISABLE SDM)
5A
SEE JUNCTION BLOCK DETAILS
C8
J9
C3
12110245
PNK 32–WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
A3
J13
A1
12110259
GRN 16–WAY
358A
.35
BRN
238A
.35
BLK/WHT
J8
C8
C3
12110245
PNK 32–WAY
LEFT HAND JUNCTION BLOCK (LHJB)
358
.35
BRN
41
.35
BRN
B6
J4
12110088
GRA 24–WAY
B10
J1
12110244
PNK 24–WAY
A2
J10
A3
12092629
BLU 16–WAY
358B
.35
BRN
238B
.35
BLK/WHT
238C
.35
BLK/WHT
450W
.35
BLK
12047663
BLK 2–WAY
12047662
D2
D10
12110207
BLU 32–WAY
A
B
AIR BAG TELLTALE
RIGHT HAND TELLTALE BANK
SEE TELLTALES
INSTRUMENT PANEL CLUSTER (IPC)
"CHECK MESSAGES" (SOLID STATE)
DRIVER SEAT BELT SWITCH
PSMELC67414AB

SIR COMPONENT LOCATION VIEW



NOTES

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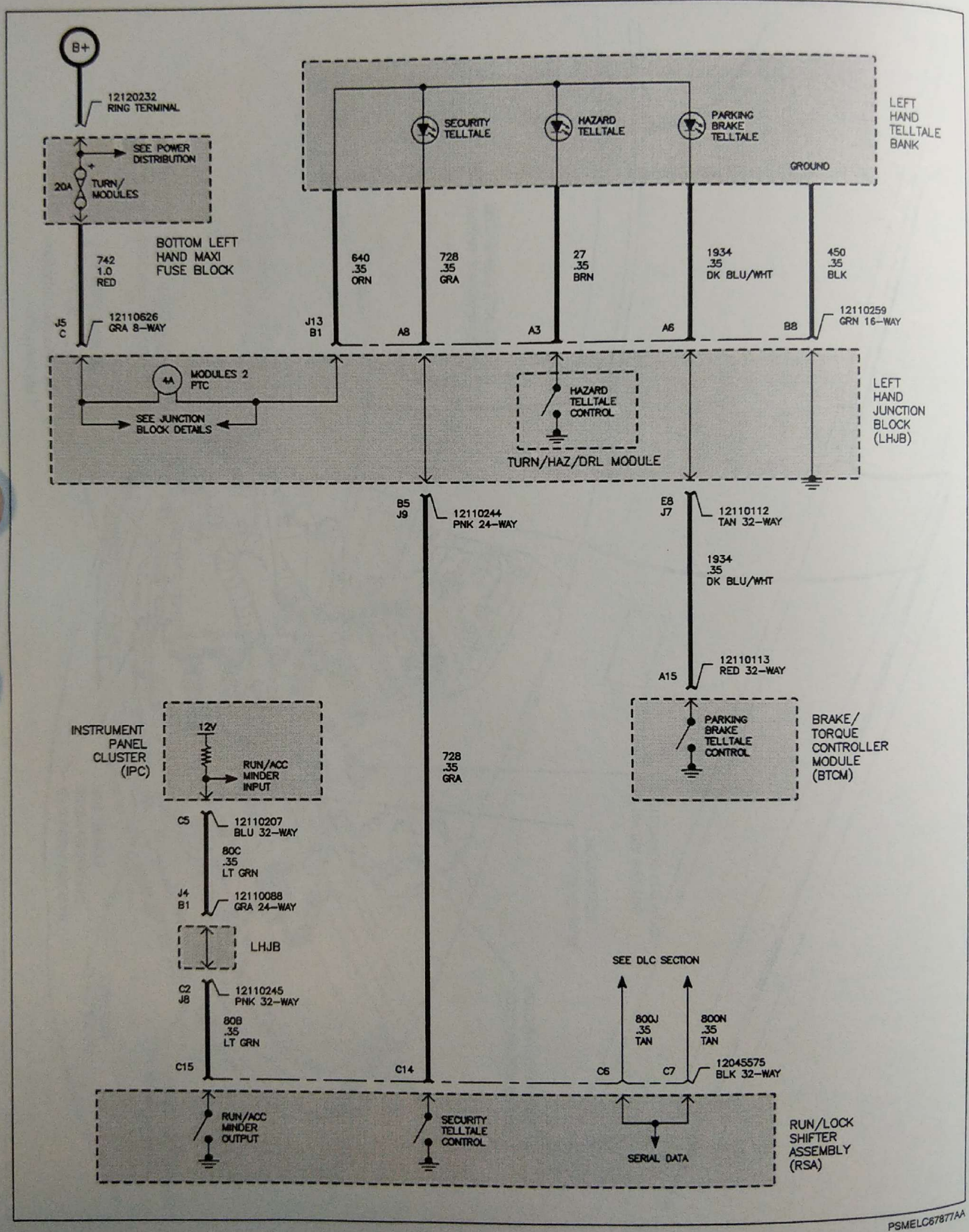
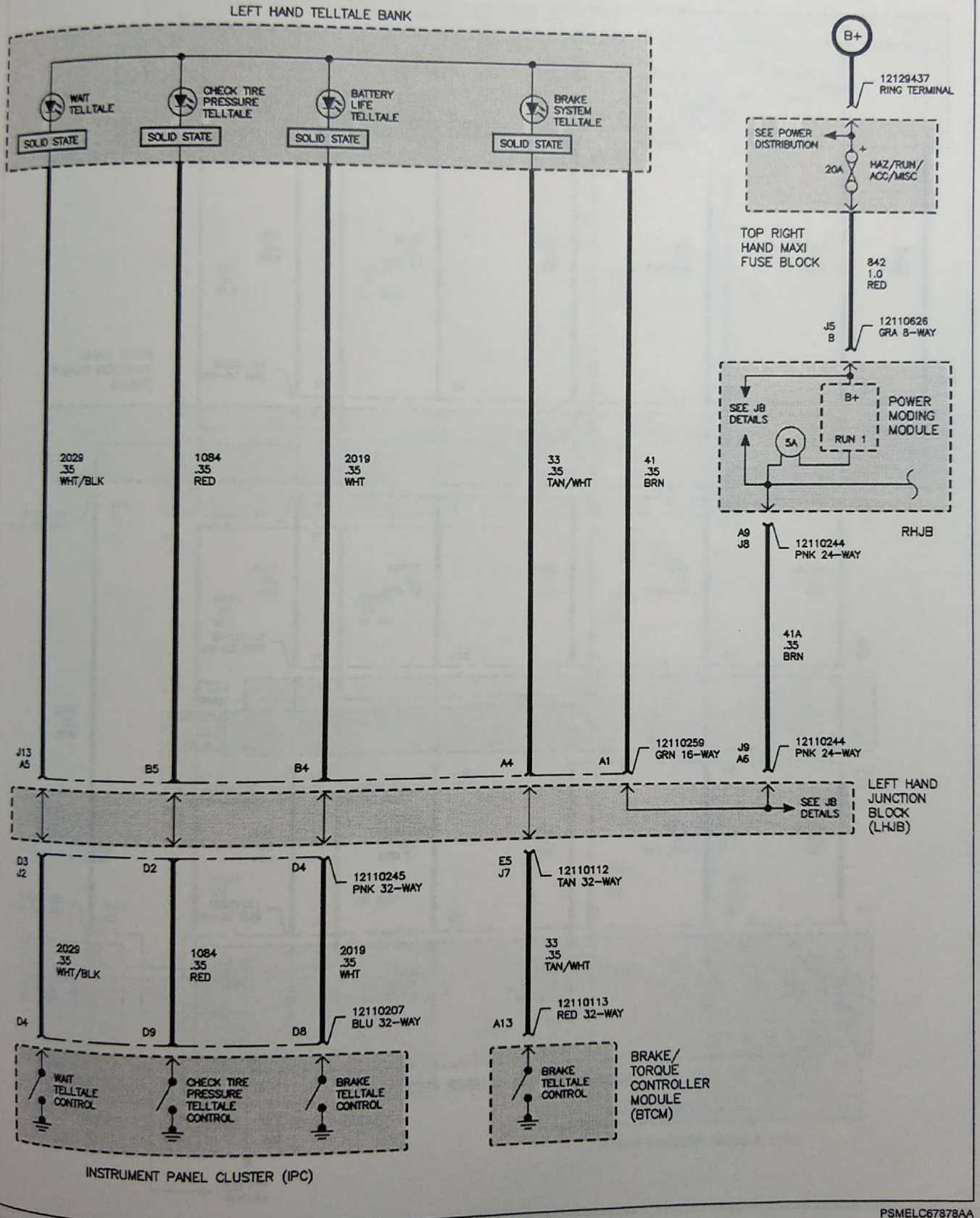
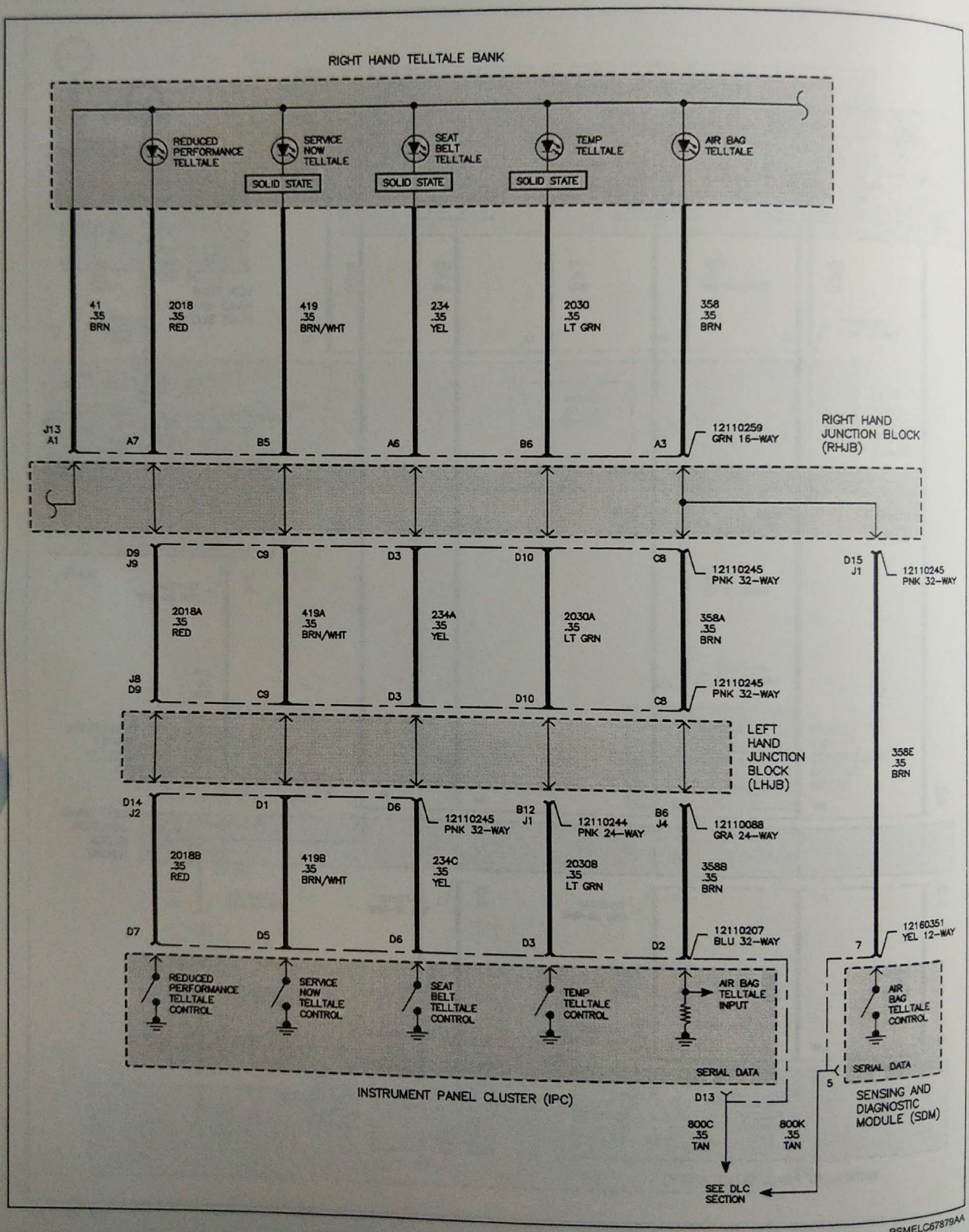
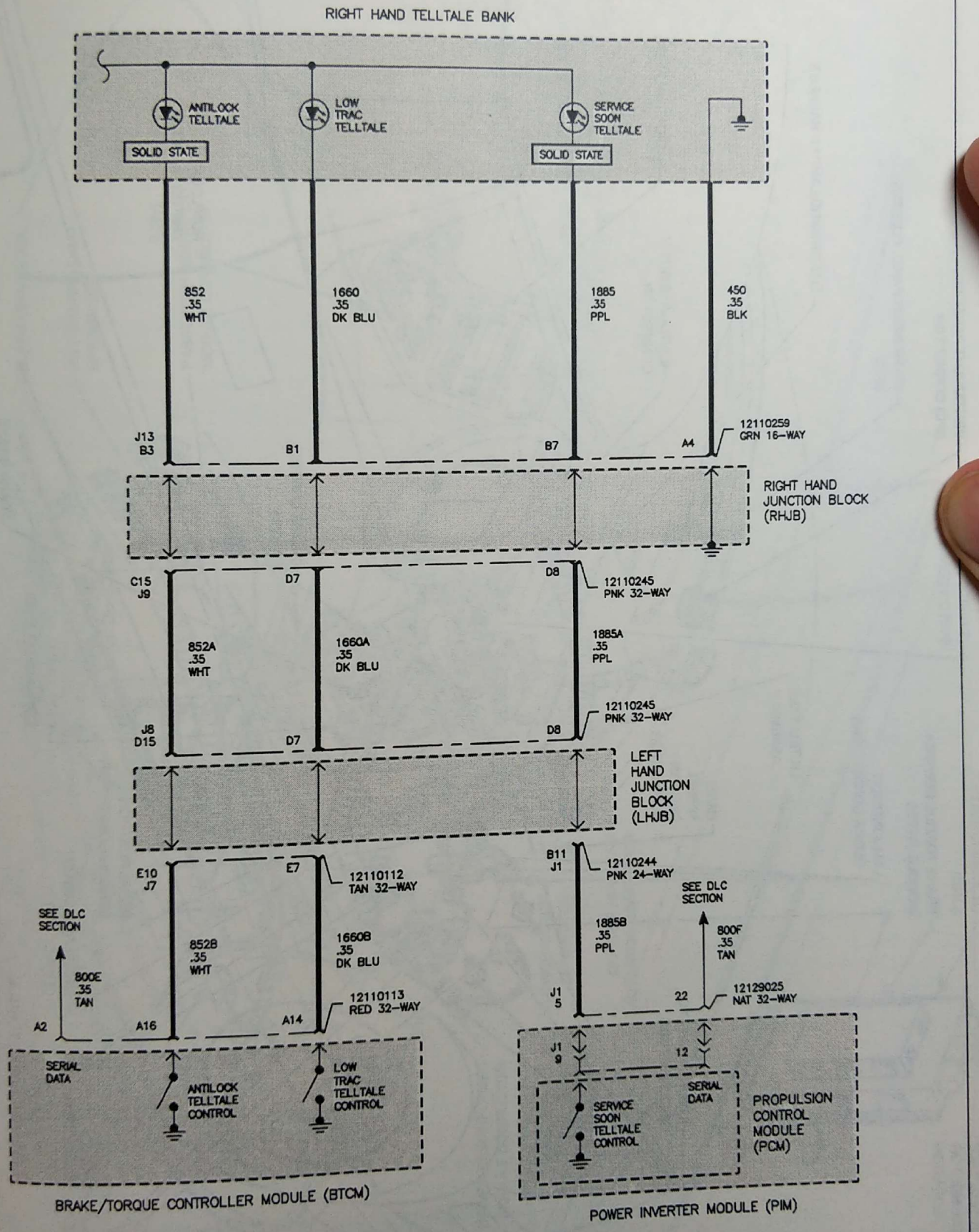
TELLTALES


B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION
20A
TURN/ MODULES
BOTTOM LEFT HAND MAXI FUSE BLOCK
742
1.0
RED
J5
C
12110626
GRA 8-WAY
SECURITY TELLTALE
HAZARD TELLTALE
PARKING BRAKE TELLTALE
GROUND
LEFT HAND TELLTALE BANK
640
.35
ORN
728
.35
GRA
27
.35
BRN
1934
.35
DK BLU/WHT
450
.35
BLK
J13
B1
A8
A3
A6
B8
12110259
GRN 16-WAY
4A
MODULES 2 PTC
SEE JUNCTION BLOCK DETAILS
HAZARD TELLTALE CONTROL
TURN/HAZ/DRL MODULE
LEFT HAND JUNCTION BLOCK (LHJB)
B5
J9
12110244
PNK 24-WAY
E8
J7
12110112
TAN 32-WAY
1934
.35
DK BLU/WHT
12110113
RED 32-WAY
A15
INSTRUMENT PANEL CLUSTER (IPC)
12V
RUN/ACC MINDER INPUT
728
.35
GRA
PARKING BRAKE TELLTALE CONTROL
BRAKE/ TORQUE CONTROLLER MODULE (BTCM)
C5
12110207
BLU 32-WAY
80C
.35
LT GRN
J4
B1
12110088
GRA 24-WAY
LHJB
SEE DLC SECTION
C2
J8
12110245
PNK 32-WAY
80B
.35
LT GRN
800J
.35
TAN
800N
.35
TAN
C15
C14
C6
C7
12045575
BLK 32-WAY
RUN/ACC MINDER OUTPUT
SECURITY TELLTALE CONTROL
SERIAL DATA
RUN/LOCK SHIFTER ASSEMBLY (RSA)
PSMELC67877AA



PSMELC67878AA

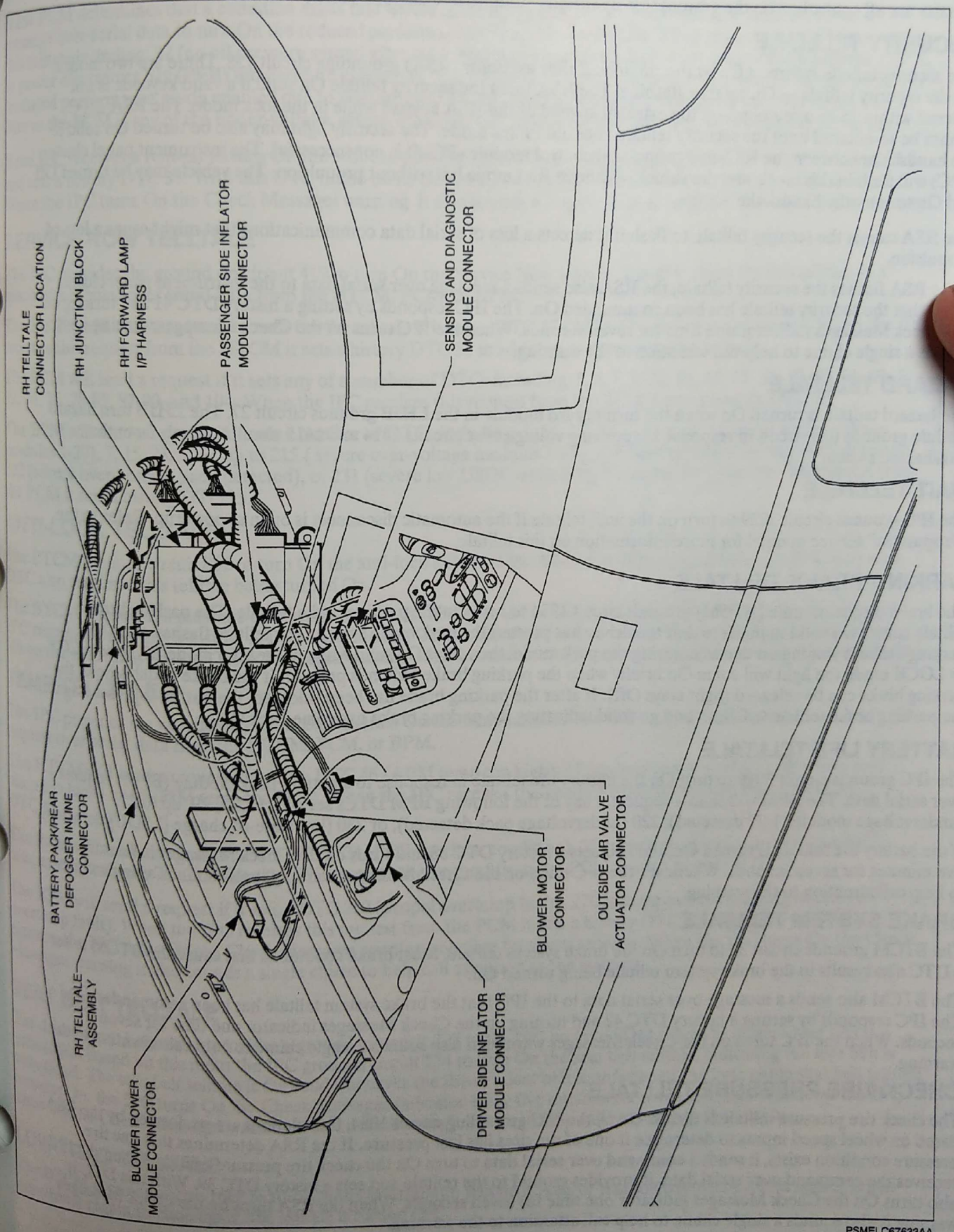

RIGHT HAND TELLTALE BANK
REDUCED PERFORMANCE TELLTALE
SERVICE NOW TELLTALE
SEAT BELT TELLTALE
TEMP TELLTALE
AIR BAG TELLTALE
SOLID STATE
SOLID STATE
SOLID STATE
41 .35 BRN
2018 .35 RED
419 .35 BRN/WHT
234 .35 YEL
2030 .35 LT GRN
358 .35 BRN
J13 A1
A7
B5
A6
B6
A3
12110259 GRN 16-WAY
RIGHT HAND JUNCTION BLOCK (RHJB)
D9 J9
C9
D3
D10
C8
12110245 PNK 32-WAY
D15 J1
12110245 PNK 32-WAY
2018A .35 RED
419A .35 BRN/WHT
234A .35 YEL
2030A .35 LT GRN
358A .35 BRN
J8 D9
C9
D3
D10
C8
12110245 PNK 32-WAY
LEFT HAND JUNCTION BLOCK (LHJB)
358E .35 BRN
D14 J2
D1
D6
12110245 PNK 32-WAY
B12 J1
12110244 PNK 24-WAY
B6 J4
12110088 GRA 24-WAY
2018B .35 RED
419B .35 BRN/WHT
234C .35 YEL
2030B .35 LT GRN
358B .35 BRN
D7
D5
D6
D3
D2
12110207 BLU 32-WAY
7
12160351 YEL 12-WAY
REDUCED PERFORMANCE TELLTALE CONTROL
SERVICE NOW TELLTALE CONTROL
SEAT BELT TELLTALE CONTROL
TEMP TELLTALE CONTROL
AIR BAG TELLTALE INPUT
AIR BAG TELLTALE CONTROL
SERIAL DATA
SERIAL DATA
5
INSTRUMENT PANEL CLUSTER (IPC)
SENSING AND DIAGNOSTIC MODULE (SDM)
D13
800C .35 TAN
800K .35 TAN
SEE DLC SECTION
PSMELC67879AA



PSMELC67880AA

TELLTALES COMPONENT LOCATION VIEWS

TELLTALES COMPONENT LOCATION VIEWS (CONTINUED)



TELLTALES

The power for most of the telltales comes from circuit 41, which is Run 1 power. Three telltales (security, hazard and park brake) receive a hot at all times power feed so they can be turned On without the vehicle in Run mode. The telltales are all controlled on the ground side by various modules as described below.

SECURITY TELLTALE

The security telltale is turned On by the run/lock shifter assembly (RSA) grounding circuit 728. There are two modes for the security telltale – On solid or flashing. The RSA turns the security telltale On solid if a valid keycode is not entered within 25 or more digits on the external keypad or the RSA keypad while in the lock mode. The RSA DTC cannot be re-entered until the security telltale goes out in this mode. The security light may also be turned On solid if the handshake between the RSA and propulsion control module (PCM) is not successful. The instrument panel cluster (IPC) will flash in this mode and the vehicle will be in Run mode but without propulsion. The vehicle may be turned Off and On to retry the handshake.

The RSA causes the security telltale to flash if it detects a loss of serial data communications that might cause a loss of propulsion.

If the RSA flashes the security telltale, the RSA also sends a message over serial data to the instrument panel cluster (IPC) that the security telltale has been commanded On. The IPC responds by setting a history DTC 41 and turning on the Check Messages indicator one time for seven seconds. When the IPC turns on the Check Messages warning it also sounds a single chime to help call attention to the warning.

HAZARD TELLTALE

The hazard telltale is turned On when the turn/hazard module in the LHJB grounds circuit 27. The LHJB turn hazard module grounds this circuit in response to receiving voltage over circuits 1414 and 1415 simultaneously from the turn/hazard switch.

WAIT TELLTALE

The IPC grounds circuit 2029 to turn on the wait telltale if the automatic disconnect is open at powerup. Refer to the "Propulsion" service manual for more information on this telltale.

PARKING BRAKE TELLTALE

The brake torque module (BTCM) grounds circuit 1934 to turn On the parking brake telltale. The parking brake telltale comes On solid to indicate that the driver has pressed the park brake switch. The telltale flashes when the parking brake is coming on due to entering the park mode, then stays On solid while in the Run mode. If in the ACCY or LOCK mode the light will come On briefly when the parking brake switch is pressed. If the brake pedal is held, the parking brake can be released (light stays Off). If after the parking brake has been released, the button is pressed again, the parking brake telltale will flash and go solid indicating the parking brake has come back On.

BATTERY LIFE TELLTALE

The IPC grounds circuit 2019 to turn On the battery life telltale in response to a battery pack module (BPM) request over serial data. The BPM will send a request if any of the following BPM DTCs set = 5, 13, 21, 29, up to 213 (undervoltage modules 1-27 detected), 220 (undervoltage pack detected), or 230 (low state-of-charge [LSOC] detected).

If the battery life telltale is turned On, the IPC sets a history DTC 38 and turns on the Check Messages indicator every five minutes for seven seconds. Whenever the IPC turns on the Check Messages warning it also sounds a single chime to help call attention to the warning.

BRAKE SYSTEM TELLTALE

The BTCM grounds circuit 33 to turn On the brake system telltale. Most brake conditions that cause the BTCM to set a DTC also results in the brake system telltale being turned On.

The BTCM also sends a message over serial data to the IPC that the brake system telltale has been commanded On. The IPC responds by setting a history DTC 42 and turning on the Check Messages indicator one time for seven seconds. When the IPC turns on the Check Messages warning it also sounds a single chime to help call attention to the warning.

CHECK TIRE PRESSURE TELLTALE

The check tire pressure telltale is turned On by the IPC grounding circuit 1084. Calculations are performed by the RSA based on wheel speed inputs to determine if one of the tires has lost pressure. If the RSA determines that low tire pressure condition exists, it sends a command over serial data to turn On the check tire pressure telltale. When the IPC receives the command over serial data, it provides ground to the telltale and sets a history DTC 39. With this DTC it also turns On the Check Messages indicator one time for seven seconds. When the RSA turns on the Check Messages warning it also sounds a single chime to help call attention to the warning.

For more information on the check tire pressure system refer to "Check Tire Pressure System" in this manual.

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REDUCED PERFORMANCE TELLTALE

The PCM reduces vehicle performance if certain failure modes are detected, or if the batteries become severely discharged.

If the PCM determines that a condition exists that would cause it to enter reduced performance mode, it sends a message over serial data to turn On the reduced performance telltale. Several PCM DTCs result in the PCM requesting this telltale including: 32 (no oil pressure sensed after oil pressure commanded), 36 (motor temperature exceeds 175° C or power electronics bay (PEB) temperature exceeds 74°C), 53 (low battery power output capability detected), and 102 (reduced performance mode enabled due to request from BPM). The BPM requests reduced performance over serial data to the PCM if any of the under-voltage, severe under-voltage, over-voltage or severe over-voltage DTCs are set.

If the IPC receives a request to turn On the reduced performance telltale, it grounds circuit 2018 to turn On the telltale and sets a history DTC 37. With this DTC it also turns On the Check Messages indictor one time for seven seconds. When the IPC turns On the Check Messages warning it also sounds a single chime to help call attention to the warning.

SERVICE NOW TELLTALE

The IPC provides the ground on circuit 419 to turn On the Service Now telltale. The IPC turns On this telltale as a result of a request over serial data from the HTCM, PCM. or BPM.

The HTCM will send a request to turn On the telltale if it sets a DTC 37 (APM 12V out of range major). When the IPC receives this request from the HTCM it sets a history DTC 31 in addition to turning on the telltale.

The PCM will send a request if it sets any of a number of DTCs including: 5, 6, 7, 9, 32, 43, 44, 45, 52, 59, 60, 61, 69, 71, 72, 74, 76, 78-85, 87-90, and 104. When the IPC receives this request from the PCM it sets a history DTC 33.

The BPM will send a request if it sets a number of DTCs including: 6, 14, 22, 30, – up to 214 (severe under-voltage modules 1-27), 7, 15, 23, 31 – up to 215 (severe over-voltage modules 1-27), 221 (severe under-voltage pack detected), 222 (severe over-voltage pack detected), or 231 (severe low USOC detected). When the IPC receives this request from the PCM it sets a history DTC 35.

ANTI-LOCK TELLTALE

The BTCM grounds circuit 852 to turn On the anti-lock telltale. Most brake conditions that cause the BTCM to set a DTC also results in this telltale being turned On.

The BTCM also sends a message over serial data to the IPC that the anti-lock telltale has been commanded On. The IPC responds by setting a history DTC 43 and turning On the Check Messages indicator one time for seven seconds. When the IPC turns On the Check Messages warning it also sounds a single chime to help call attention to the warning.

TEMP TELLTALE

The IPC provides the ground on circuit 2030 to turn On the temp telltale. The IPC turns On this telltale as a result of a request over serial data from the HTCM, PCM, or BPM.

The HTCM will send a request if it sets a DTC 46 (APM temp too high), 47 (coolant temp too high), 48 (drive unit temp too high) or 49 (PIM temp too high). When the IPC receives this request from the HTCM it sets a history DTC 32.

The PCM will send a request if it sets a DTC 34 (PEB overheat condition), 36 (motor temp exceeds 175°C or PEB temperature exceeds 74°C). When the IPC receives this request from the PCM it sets a history DTC 34.

The BPM will send a request if it sets a DTC 269 (propel overtemp fault), 270 (charge overtemp fault), or 288 (CP overtemp fault). When the IPC receives this request from the PCM it sets a history DTC 36. While the request is present, the IPC turns On the Check Messages warning one time for seven seconds. When the IPC turns On the Check Messages warning it also sounds a single chime to help call attention to the warning.

SEAT BELT TELLTALE

The driver's seat belt switch provides a ground to circuit 238 to the IPC and the SDM when the driver's seat belt is unbuckled. Based on this input the IPC grounds circuit 234 to turn On the seat belt telltale, indicating the seat belt is unbuckled. The seat belt telltale is On solid whenever the driver's seat belt is unfastened. As long as the seat belt telltale remains On, the IPC turns On the Check Messages indicator every five minutes for seven seconds. Whenever the IPC turns On the Check Messages warning it also sounds a single chime to help call attention to the warning.

LOW TRAC TELLTALE

The BTCM grounds circuit 1660 to turn On the low traction telltale if ABS or traction control becomes active. When the wheels regain traction again, the telltale is turned Off.

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AIR BAG TELLTALE

The air bag telltale is turned On when the SDM grounds circuit 358. The SDM grounds this circuit whenever an SIR DTC is set. The air bag telltale is also turned on by the shorting bars in the SDM connector whenever the SDM is disconnected.

The IPC monitors the SIR telltale circuit 358 to determine if it is grounded by the SDM. If circuit 358 is grounded, the IPC responds by setting a history DTC 40 and turning On the Check Messages indicator one time for seven seconds. When the IPC turns On the Check Messages warning it also sounds a single chime to help call attention to the warning.

SERVICE SOON TELLTALE

The PCM grounds circuit 1885 to turn On the service soon telltale if there is a condition present under which it is ok to drive, but the vehicle should be serviced at the driver's earliest convenience. This may occur as a result of one of a number of PCM DTCs setting, or as a request by the BPM, HTCM, APM, or BTCM.

The BPM requests the telltale be turned On for the following DTCs: 217, 219, 225, 226, 227, 228, 229, three or more of 233-266, three or more module voltage faults, 285, 286, 291, 292, or 304.

The HTCM requests the telltale be turned On for the following HTCM/APM DTCs: 12, 14, 16, 17, 27, 28, 31, 39, 41, 42, 45, 50, 52, 53, 54, 58, 59, 60, 62, 63, or 64.

The BTCM requests the telltale be turned On for the following DTCs: 11, 141, 167, or 168.

The PCM sends a telltale request On its own behalf if one or more of the following DTCs set: 1, 2, 3, 4, 8, 10, 11, 12, 13, 26, 27, 28, 29, 30, 31, 33, 41, 42, 47, 48, 49, 50, 51, 54, 55, 56, 57, 73, 97, 98, 99, 100, 101, 103, 105, 106 or 107.

The PCM also sends a message over serial data to the IPC that the service soon telltale has been commanded On. The IPC responds by setting a history DTC 45 and turning On the check messages indicator one time for seven seconds. When the IPC turns On the check messages warning it also sounds a single chime to help call attention to the warning.

TELLTALES TROUBLE TREE INDEX

- Chart 1 – Security Telltale Inoperative/On All the Time/Flashing
- Chart 2 – Hazard Telltale Inoperative/On All the Time
- Chart 3 – Wait Telltale Inoperative/On All the Time
- Chart 4 – Parking Brake Telltale Inoperative/On All the Time
- Chart 5 – Battery Life Telltale Inoperative/On All the Time
- Chart 6 – Brake Telltale Inoperative/On All the Time
- Chart 7 – Check Tire Pressure Telltale Inoperative/On All the Time
- Chart 8 – Reduced Performance Telltale Inoperative/On All the Time
- Chart 9 – Service Now Telltale Inoperative/On All the Time
- Chart 10 – Anti-Lock Telltale Inoperative/On All the Time
- Chart 11 – Temperature Telltale Inoperative/On All the Time
- Chart 12 – Seat Belt Telltale Inoperative/On All the Time
- Chart 13 – Low Trac Telltale Inoperative/On All the Time
- Chart 14 – Service Soon Telltale Inoperative/On All the Time
- Chart 15 – Security, Hazard, and Parking Brake Telltales All Inoperative
- Chart 16 – Left Telltale Bank Wait, Parking Brake, Brake and Check Tire Pressure Telltales All Inoperative
- Chart 17 – Right Telltale Bank All Inoperative
- Chart 18 – Right Telltale Bank Service Now, Antilock, Temp, Seat Belt and Service Soon All Inoperative

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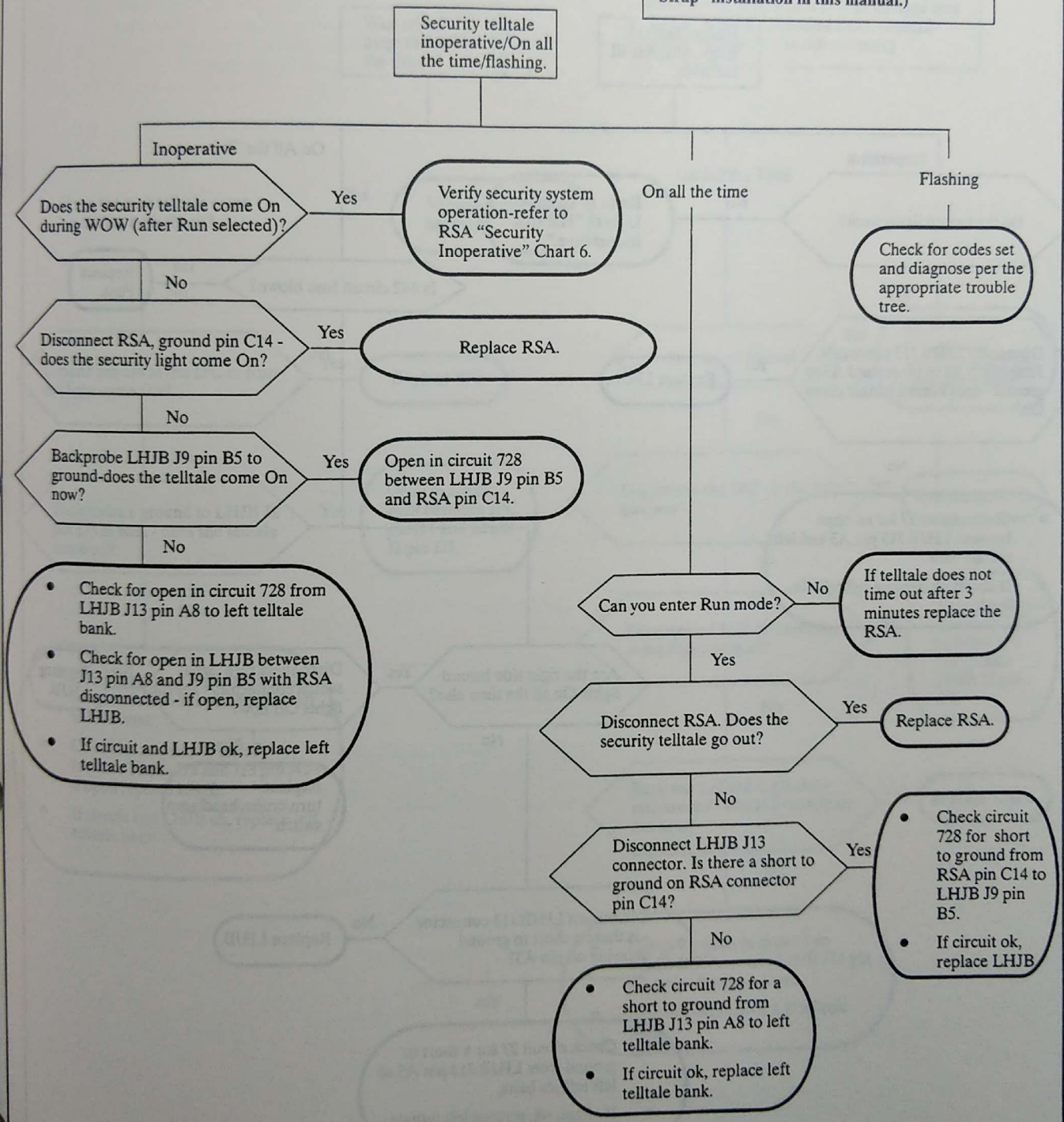
SECURITY TELLTALE INOPERATIVE/ON ALL THE TIME/FLASHING

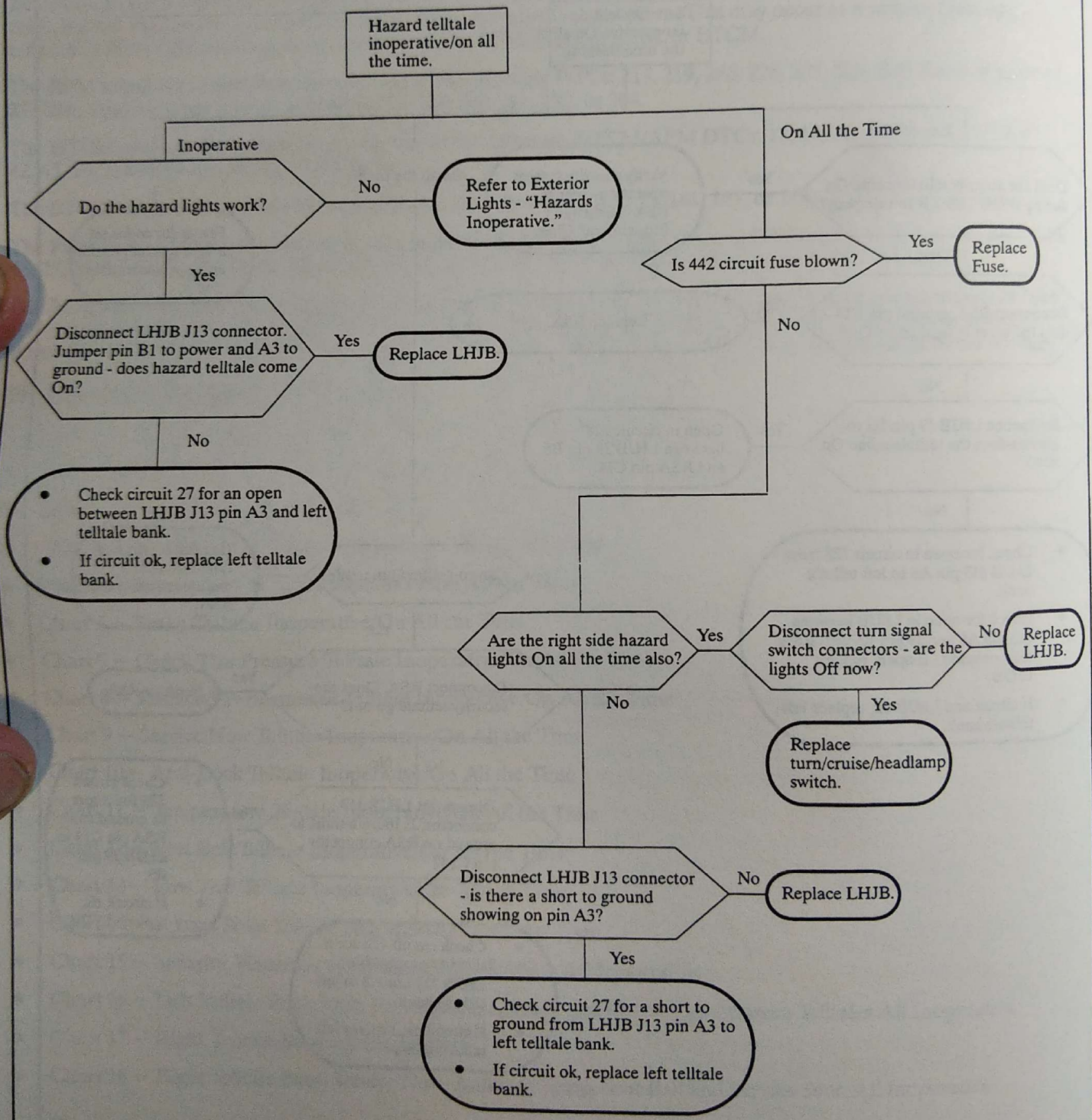
CHART 1

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



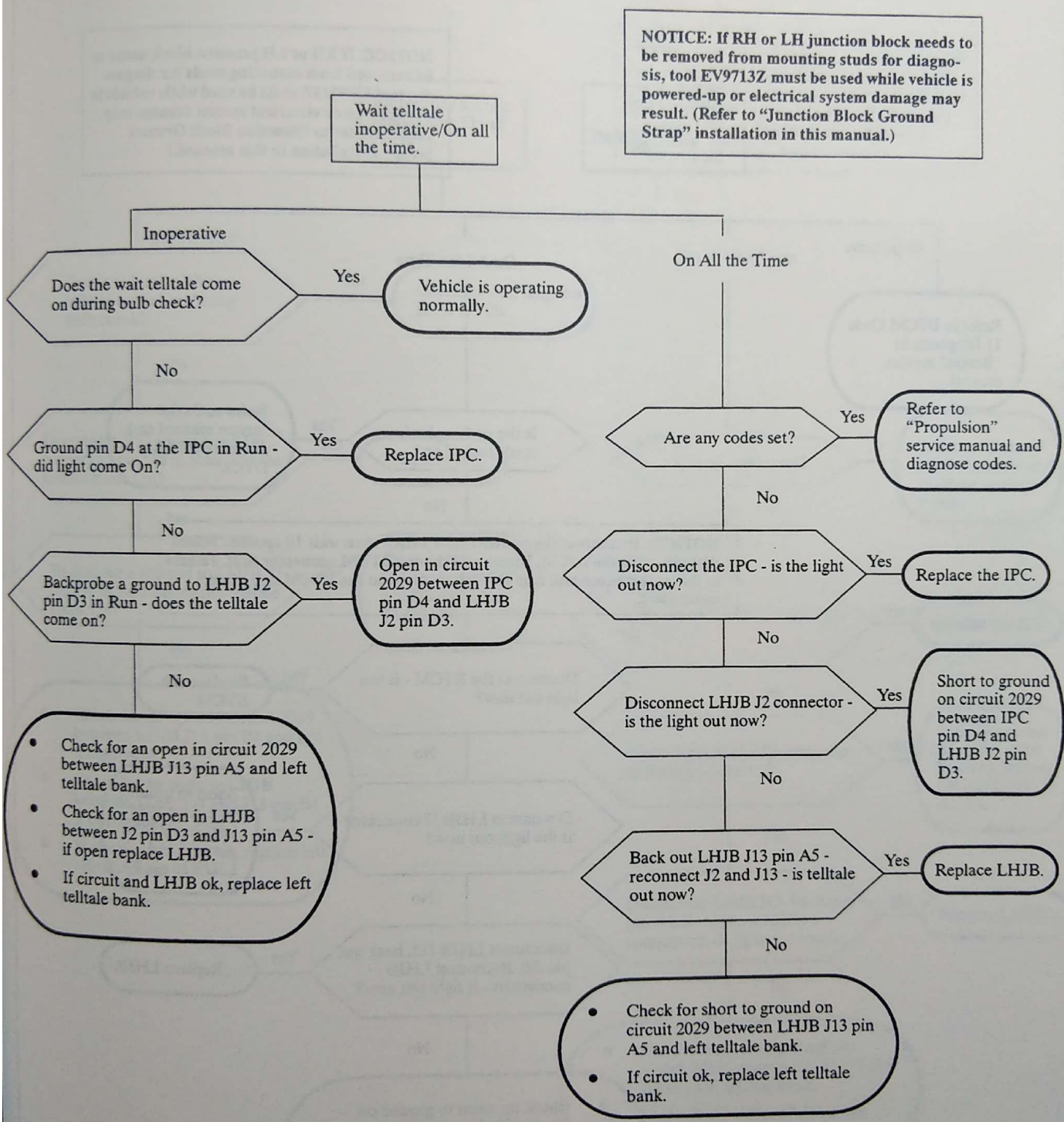
HAZARD TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 2



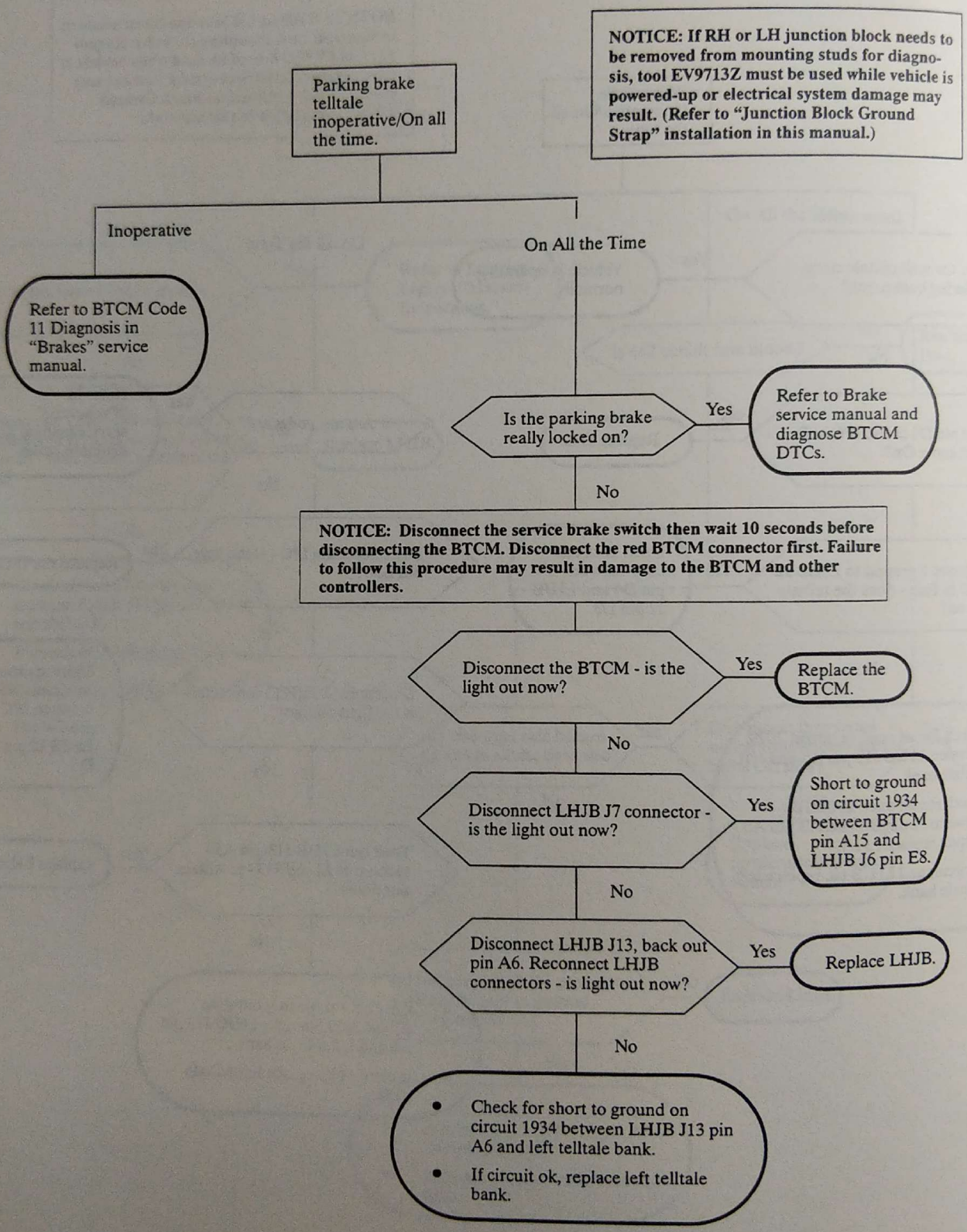
WAIT TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 3



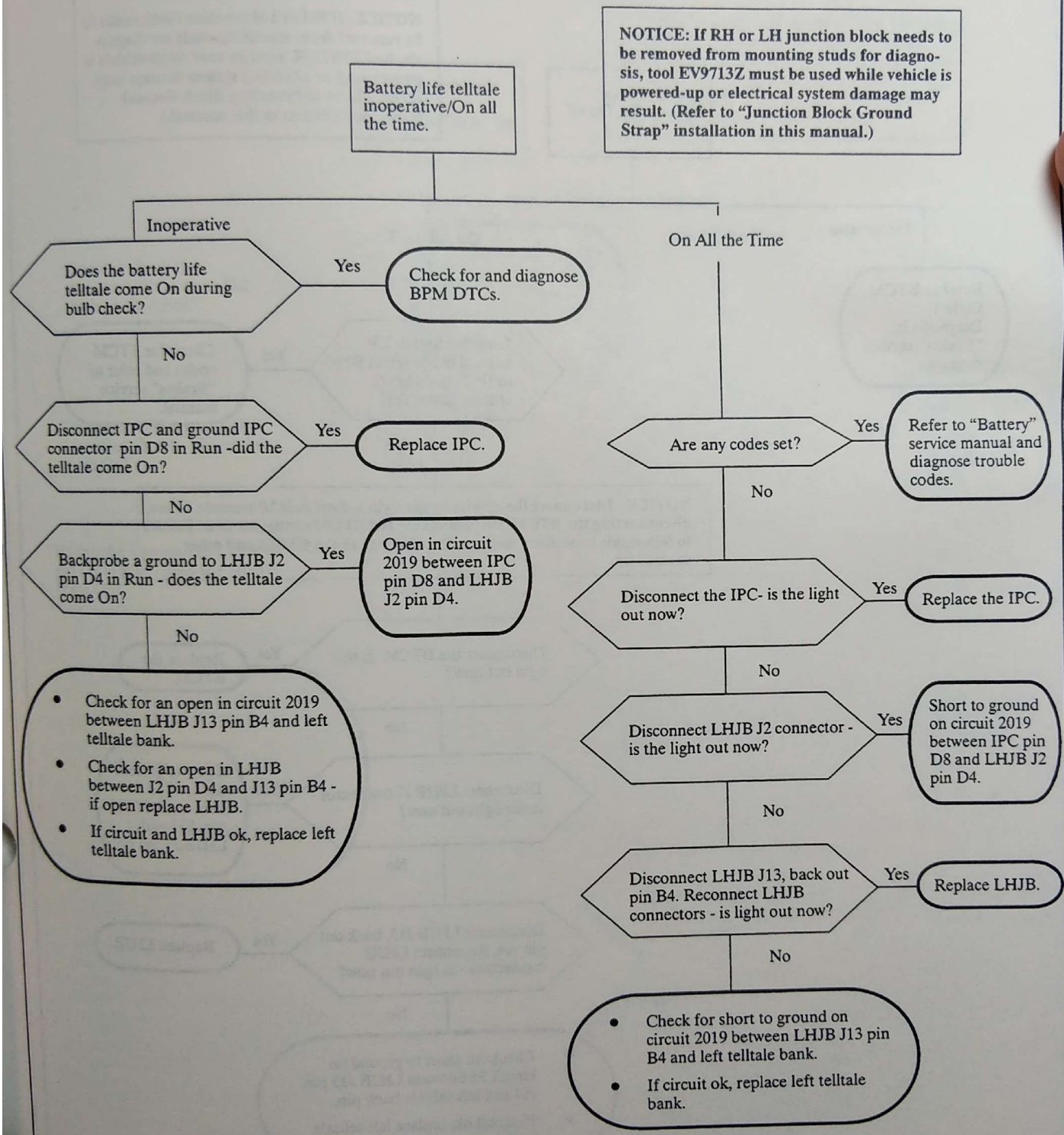
PARKING BRAKE TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 4



BATTERY LIFE TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 5



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BRAKE TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 6

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Brake telltale inoperative/On all the time.

- Inoperative
  - Refer to BTCM Code 11 Diagnosis in "Brakes" service manual.
- On All the Time
  - On scam tool in EV normal mode select BPM to IPC - does brake telltale show Yes?
    - Yes → Check for BTCM codes and refer to "Brakes" service manual.
    - No

NOTICE: Disconnect the service brake switch then wait 10 seconds before disconnecting the BTCM. Disconnect the red BTCM connector first. Failure to follow this procedure may result in damage to the BTCM and other controllers.

- Disconnect the BTCM- is the light out now?
  - Yes → Replace the BTCM.
  - No
- Disconnect LHJB J7 connector - is the light out now?
  - Yes → Short to ground on circuit 33 between BTCM pin A13 and LHJB J7 pin E5.
  - No
- Disconnect LHJB J13, back out pin A4. Reconnect LHJB connectors - is light out now?
  - Yes → Replace LHJB.
  - No
- Check for short to ground on circuit 33 between LHJB J13 pin A4 and left telltale bank pin.
- If circuit ok, replace left telltale bank.

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CHECK TIRE PRESSURE TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 7

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Check tire pressure telltale inoperative/On all the time.

Inoperative

Does the check tire pressure telltale come On during bulb check?

- Yes → Circuit ok -if tire is low refer to Tire Pressure warning system section "Tire Low or Flat With No Low Tire Pressure TT."
- No → Disconnect IPC, ground IPC connector pin D9 - did telltale come On?
  - Yes → Replace IPC.
  - No → Backprobe a ground to LHJB J2 pin D2 in Run - does the telltale come On?
    - Yes → Open in circuit 1084 between IPC pin D9 and LHJB J2 pin D2.
    - No →
      - Check for an open in circuit 1084 between LHJB J13 pin B5 and left telltale bank.
      - Check for an open in LHJB between J2 pin D2 and J13 pin B5 - if open replace LHJB.
      - If circuit and LHJB ok, replace left telltale bank.

On All the Time

On scan tool in EV normal mode select RSA to BPM - does check tire pressure telltale show On?

- Yes → Refer to Check Tire pressure system - "Check Tire Pressure Telltale On."
- No → Disconnect IPC - is the light out now?
  - Yes → Replace the IPC.
  - No → Disconnect LHJB J2 connector - is the light out now?
    - Yes → Short to ground on circuit 1084 between IPC pin D9 and LHJB J2 pin D2.
    - No → Disconnect LHJB J13 connector. Back out pin B5. Reconnect LHJB connectors - is light out now?
      - Yes → Replace LHJB.
      - No →
        - Check for short to ground on circuit 1084 between LHJB J13 pin B5 and left telltale bank.
        - If circuit ok, replace left telltale bank.

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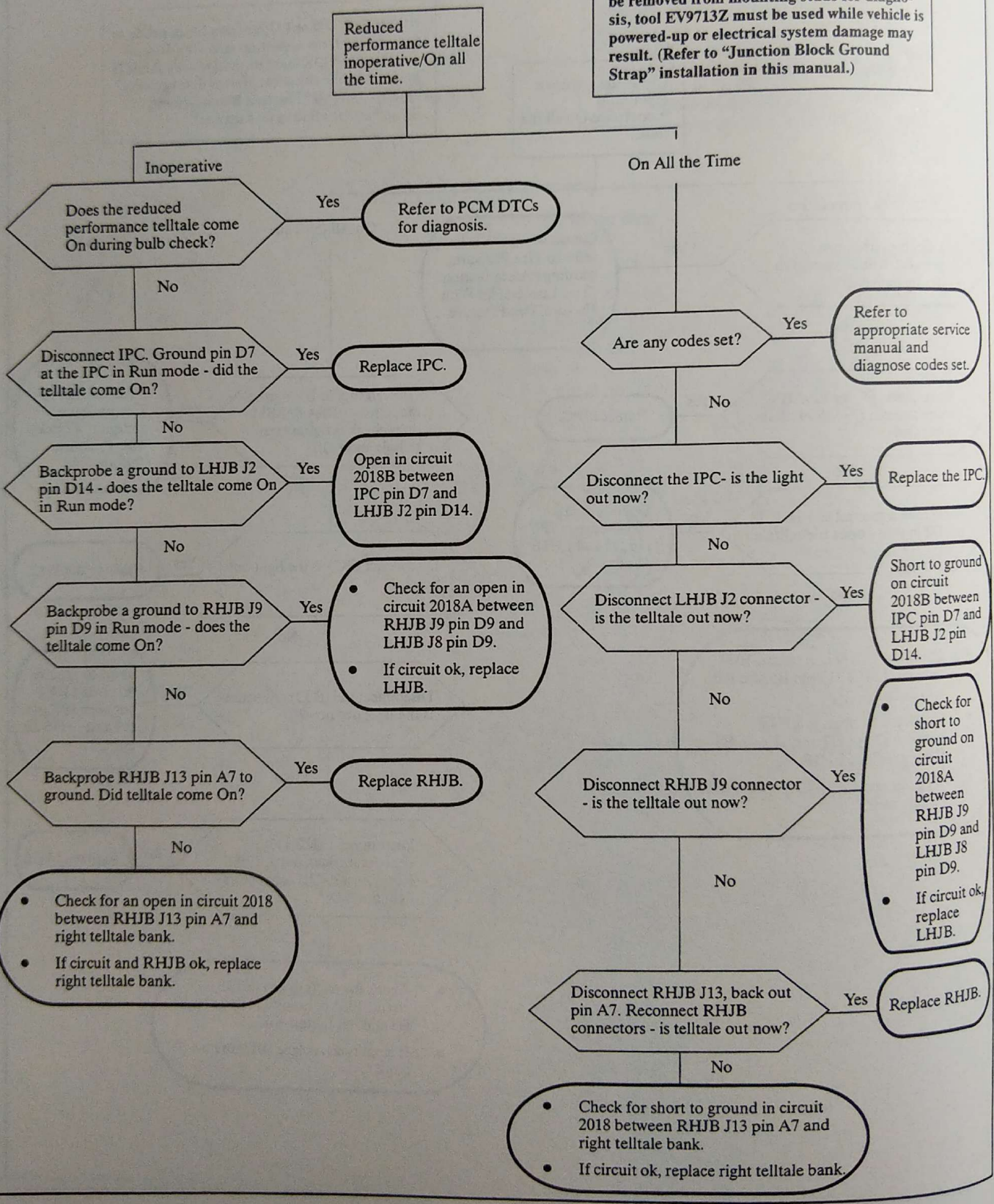
REDUCED PERFORMANCE TELLTALE INOPERATIVE/ON ALL THE TIME

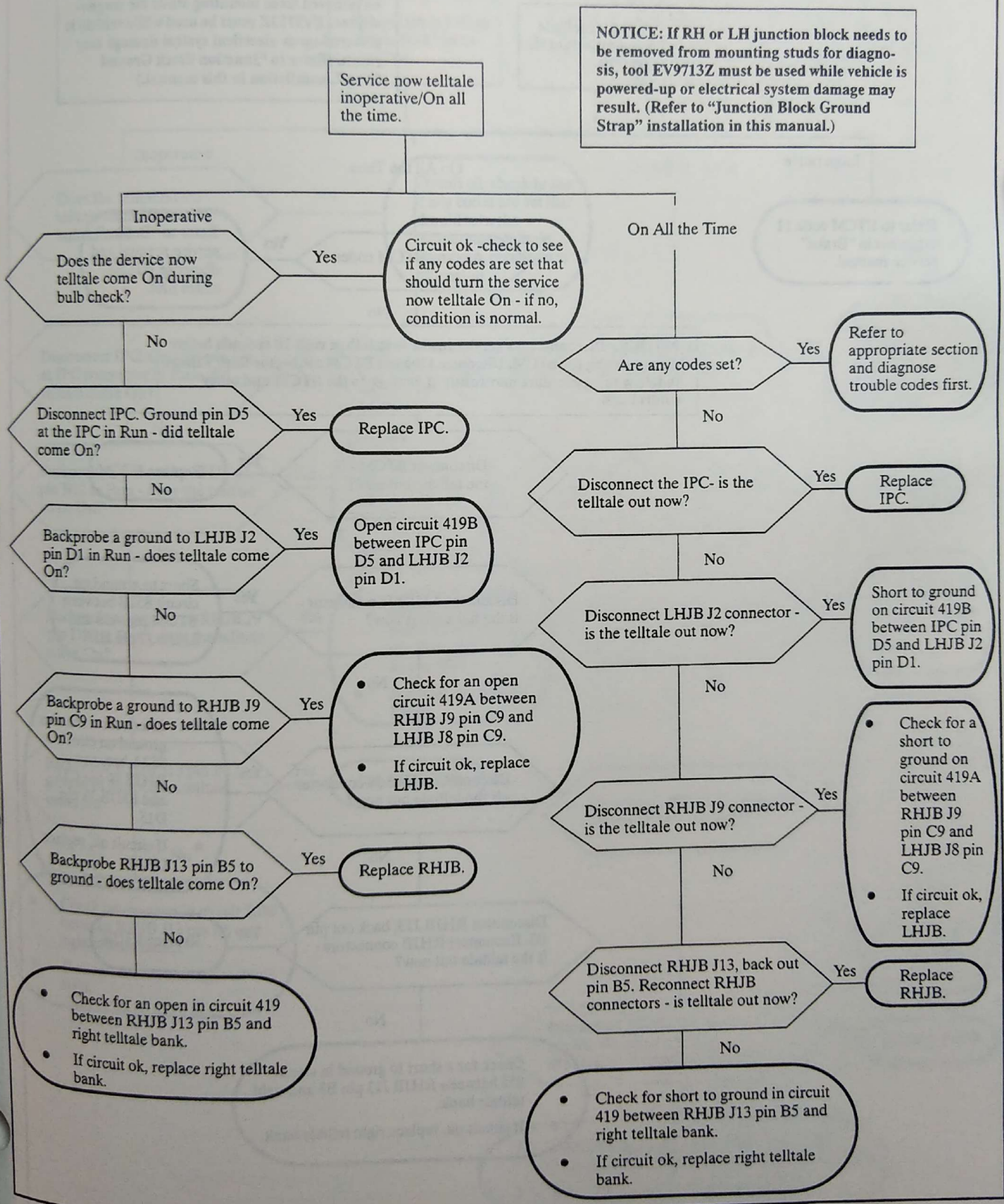
CHART 8

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



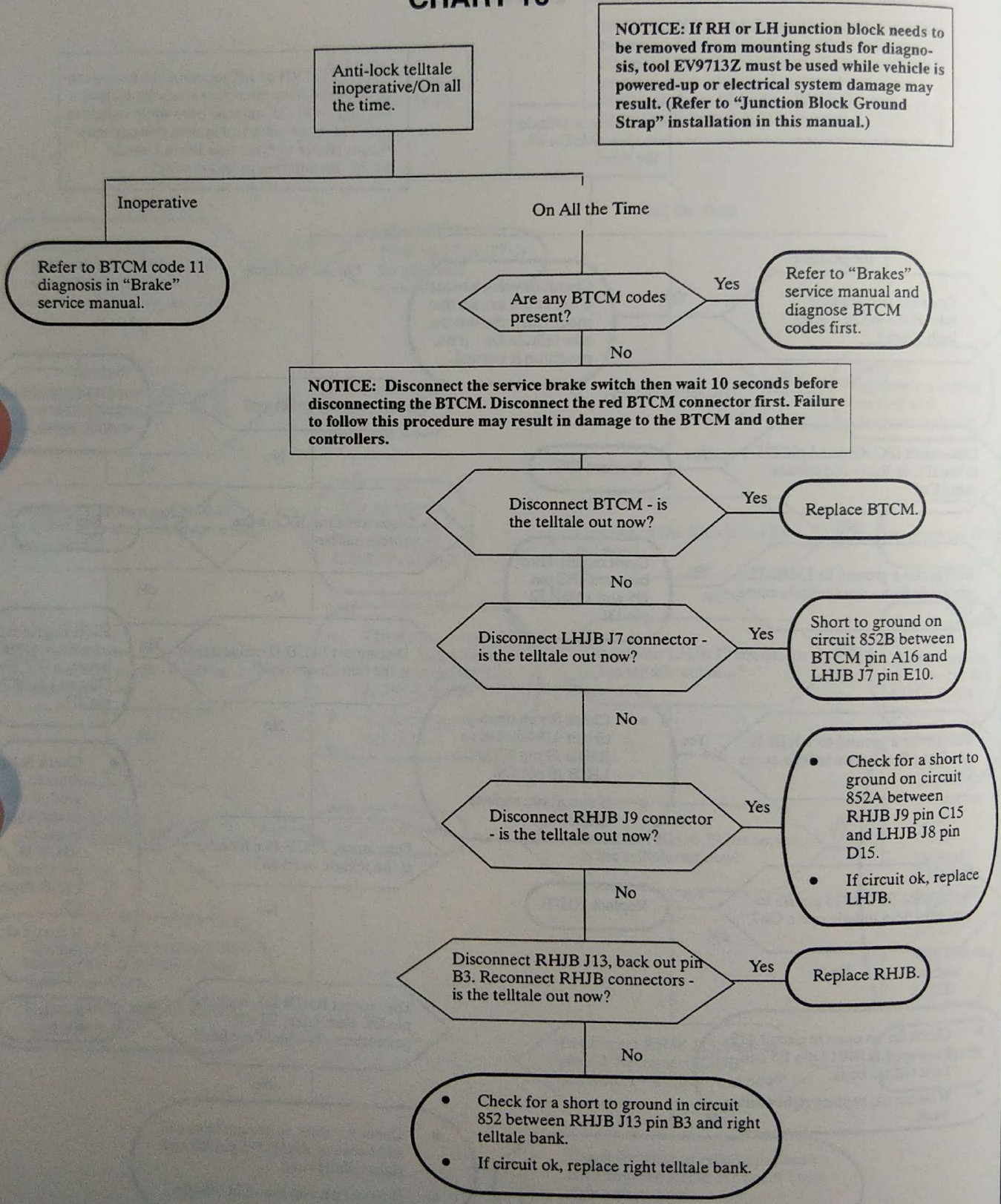
SERVICE NOW TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 9



ANTI-LOCK TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 10



TEMPERATURE TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 11

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Temperature telltale inoperative/On all the time.

Inoperative

Does the temperature telltale come On during bulb check?

- Yes → Circuit ok, check to see if any codes are set that should turn the temperature telltale On - if no, condition is normal.
- No → Disconnect IPC. Ground pin D3 at IPC connector in Run- did telltale come On?
  - Yes → Replace IPC.
  - No → Backprobe a ground to LHJB J1 pin B12 in Run - does the telltale come On?
    - Yes → Open circuit 2030B between IPC pin D3 and LHJB J1 pin B12.
    - No → Backprobe a ground to RHJB J9 pin D10 in Run - does the telltale come On?
      - Yes →
        - Check for an open circuit 2030A between RHJB J9 pin D10 and LHJB J8 pin D10.
        - If circuit ok, replace LHJB.
      - No → Backprobe RHJB J13 pin B6 to ground in Run - does telltale come On?
        - Yes → Replace RHJB.
        - No →
          - Check for an open in circuit 2030 between RHJB J13 pin B6 and right telltale bank.
          - If circuit ok, replace right telltale bank.

On All the Time

Are any BPM, PCM, or HTCM codes set?

- Yes → Refer to appropriate service manual and diagnose trouble codes first.
- No → Disconnect IPC - is the light out now?
  - Yes → Replace IPC.
  - No → Disconnect LHJB J1 connector - is the telltale out now?
    - Yes → Short to ground on circuit 2030B between IPC pin D3 and LHJB J1 pin B12.
    - No → Disconnect RHJB J9 connector - is the telltale out now?
      - Yes →
        - Check for a short to ground on circuit 2030A between RHJB J9 pin D10 and LHJB J8 pin D10.
        - If circuit ok, replace LHJB.
      - No → Disconnect RHJB J13, back out pin B6. Reconnect RHJB connectors is telltale out now?
        - Yes → Replace RHJB.
        - No →
          - Check for a short to ground in circuit 2030 between RHJB J13 pin B6 and right telltale bank.
          - If circuit ok, replace right telltale bank.

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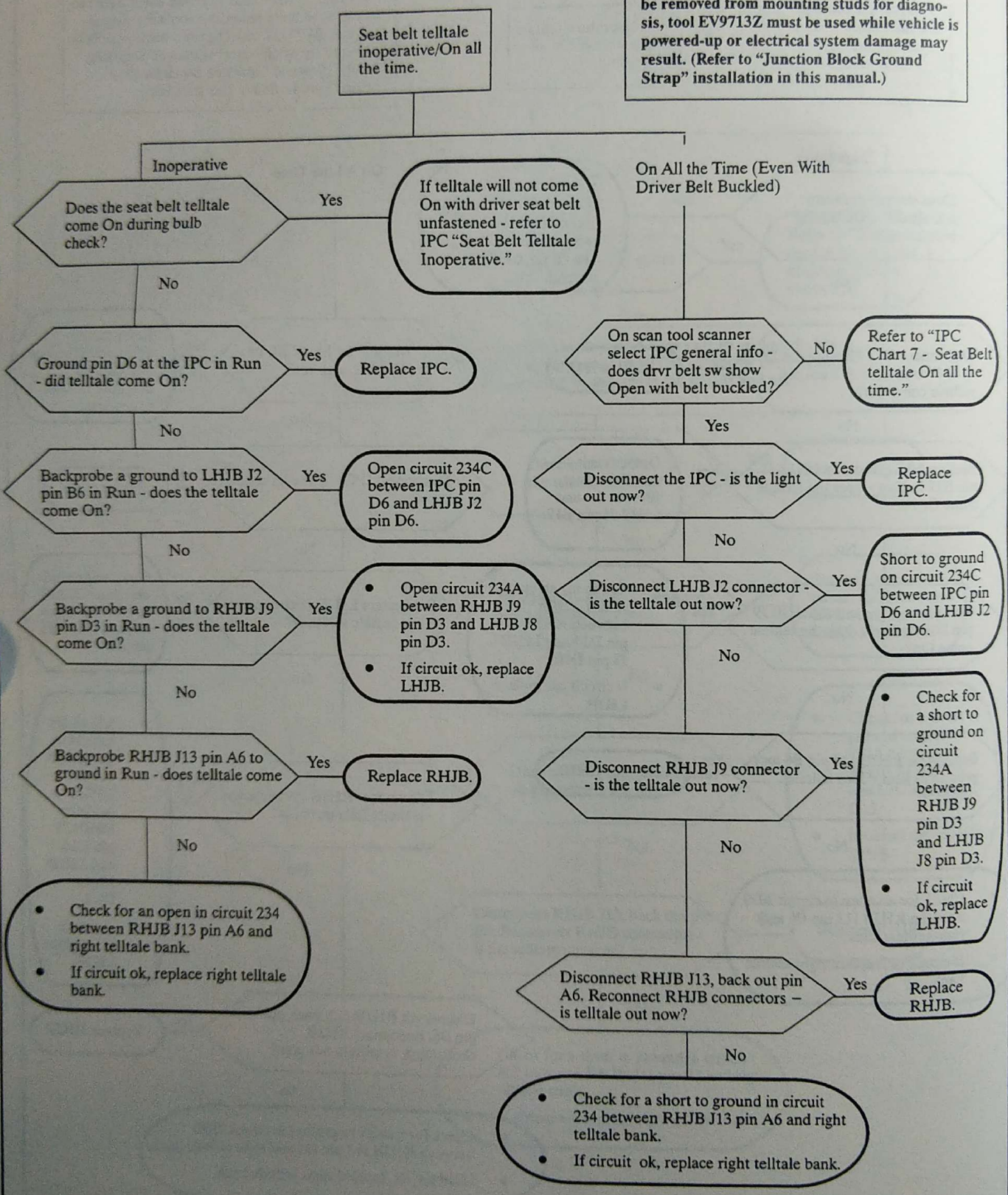
SEAT BELT TELLTALE INOPERATIVE/ON ALL THE TIME

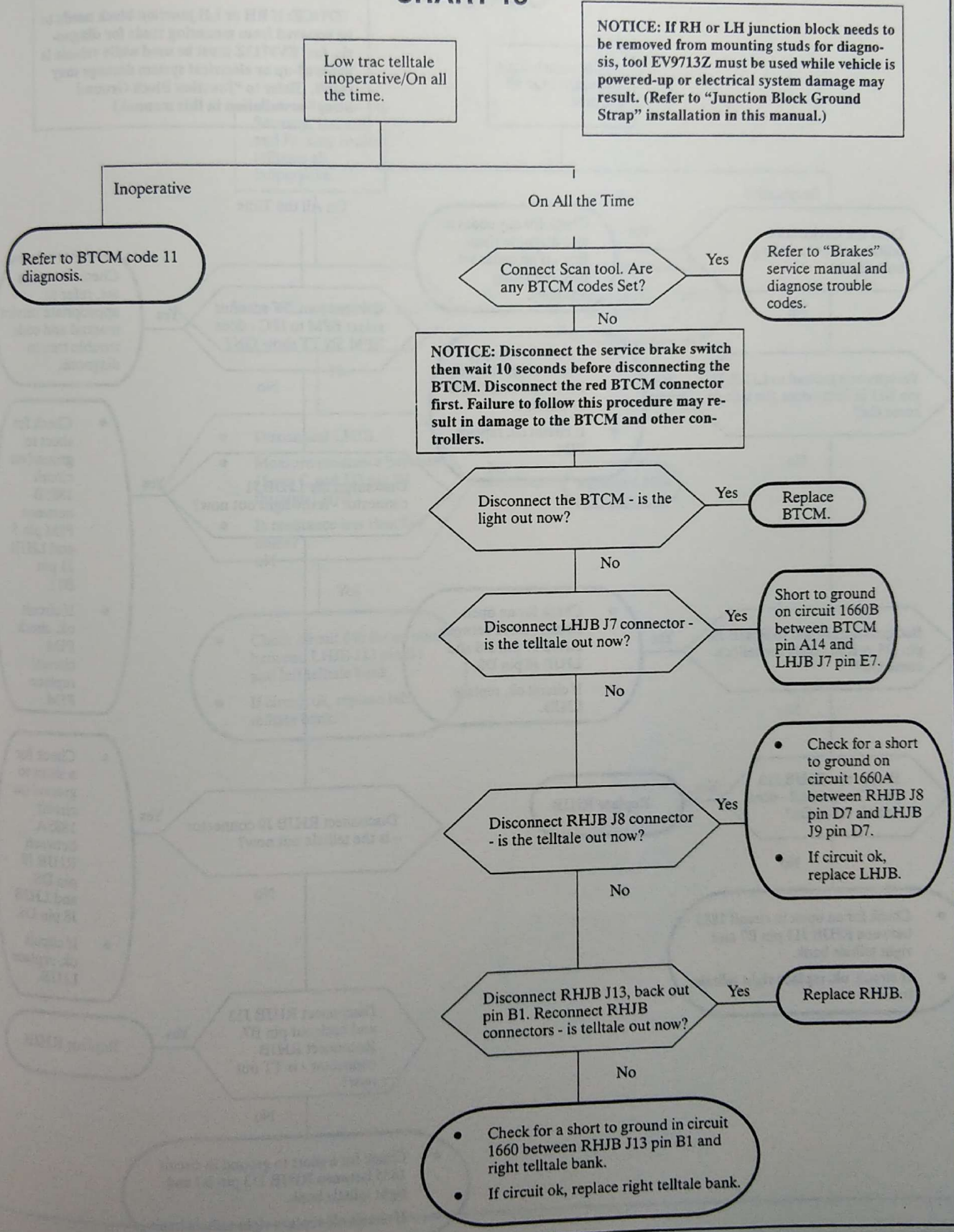
CHART 12

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



LOW TRAC TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 13



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SERVICE SOON TELLTALE INOPERATIVE/ON ALL THE TIME

CHART 14

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

service soon telltale inoperative/On all the time.

Inoperative

Does the service soon telltale come On during bulb check?

- Yes → Check for any codes set and diagnose those first - if no codes set, light operating normally.
- No →

Backprobe a ground to LHJB J1 pin B11 in Run - does the telltale come On?

- Yes →
  - Check for an open circuit 1885B between PEB pin 5 and LHJB J1 pin B11.
  - If circuit ok, replace PIM.
- No →

Backprobe a ground to RHJB J9 pin D8 in Run - does the telltale come On?

- Yes →
  - Check for an open circuit 1885A between RHJB J9 pin D8 and LHJB J8 pin D8.
  - If circuit ok, replace LHJB.
- No →

Backprobe RHJB J13 pin B7 to ground - does telltale come On?

- Yes → Replace RHJB.
- No →
  - Check for an open in circuit 1885 between RHJB J13 pin B7 and right telltale bank.
  - If circuit ok, replace right telltale bank.

On All the Time

On scan tool EV scanner select BPM to IPC - does BPM SN TT show ON?

- Yes → Check for codes set, refer to appropriate service manual and code trouble tree to diagnose.
- No →

Disconnect the LHJB J1 connector - is the light out now?

- Yes →
  - Check for short to ground on circuit 1885B between PIM pin 5 and LHJB J1 pin B11.
  - If circuit ok, check PIM circuit/ replace PIM.
- No →

Disconnect RHJB J9 connector - is the telltale out now?

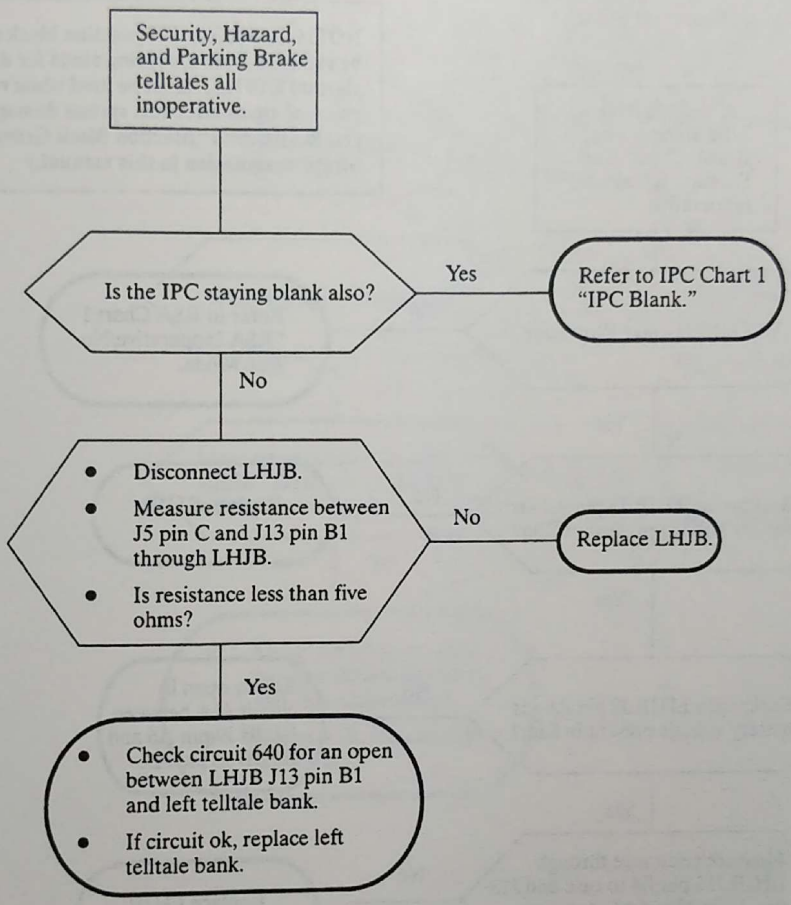
- Yes →
  - Check for a short to ground on circuit 1885A between RHJB J9 pin D8 and LHJB J8 pin D8.
  - If circuit ok, replace LHJB.
- No →

Disconnect RHJB J13 and back out pin B7. Reconnect RHJB connector - is TT out now?

- Yes → Replace RHJB.
- No →
  - Check for a short to ground in circuit 1885 between RHJB J13 pin B7 and right telltale bank.
  - If circuit ok, replace right telltale bank.

SECURITY, HAZARD, AND PARKING BRAKE TELLTALES ALL INOPERATIVE

CHART 15



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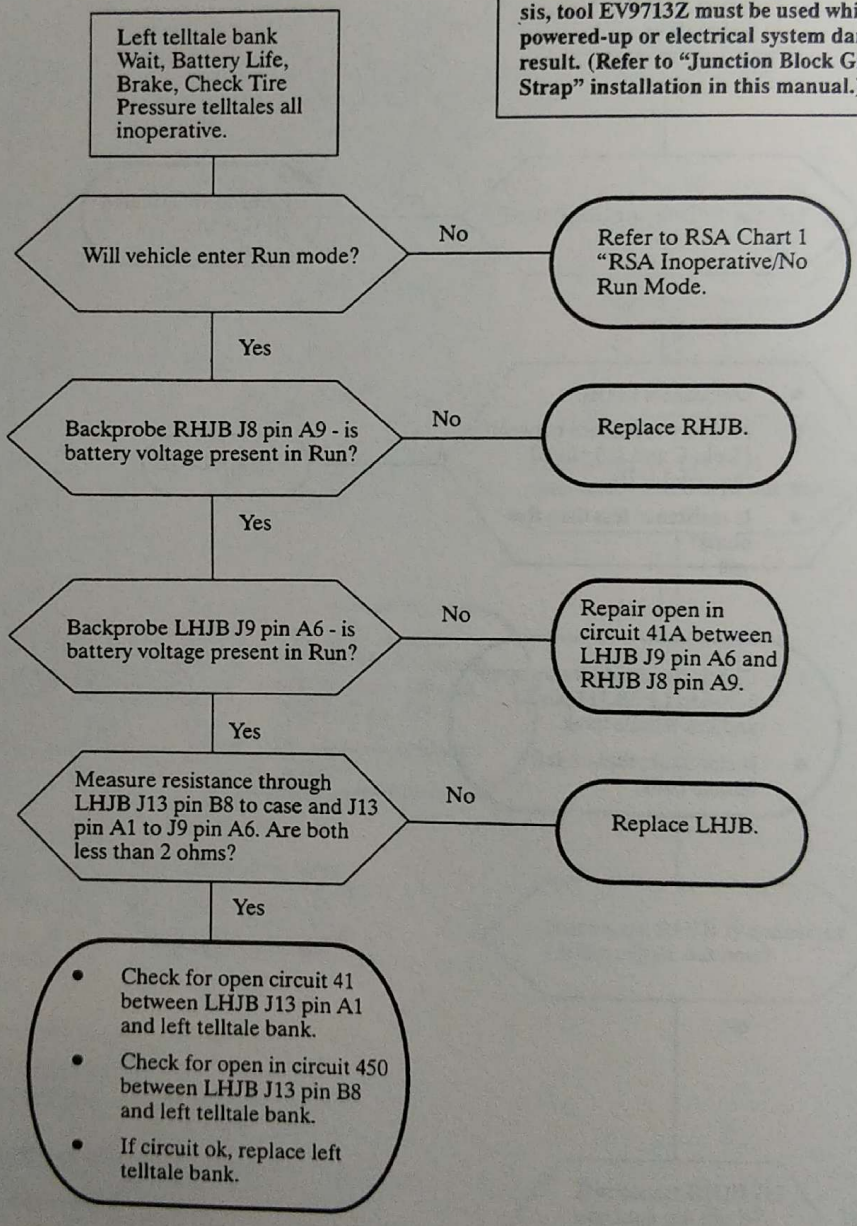
LEFT TELLTALE BANK WAIT, BATTERY LIFE, BRAKE AND CHECK TIRE PRESSURE TELLTALES ALL INOPERATIVE

CHART 16

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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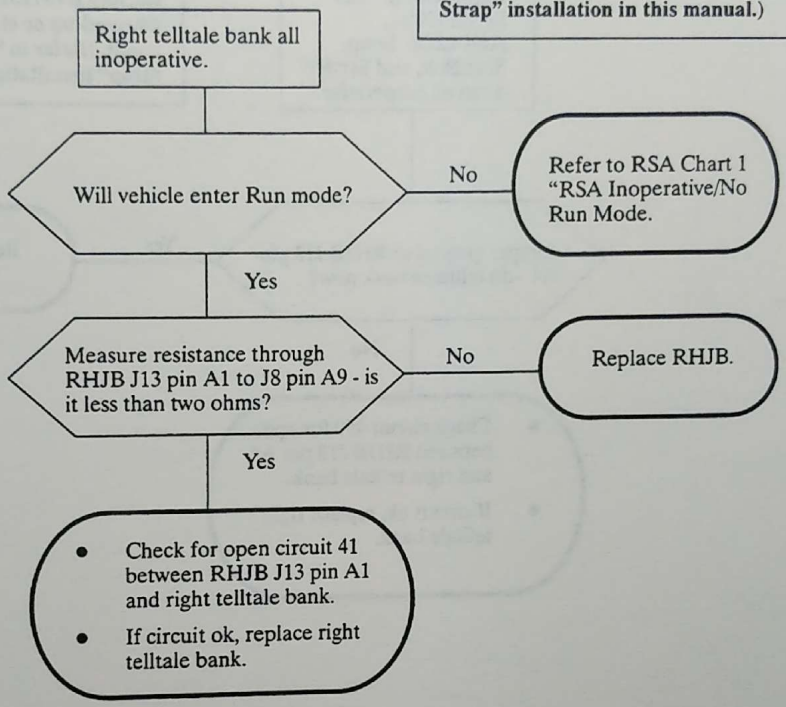
RIGHT TELLTALE BANK ALL INOPERATIVE

CHART 17

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)



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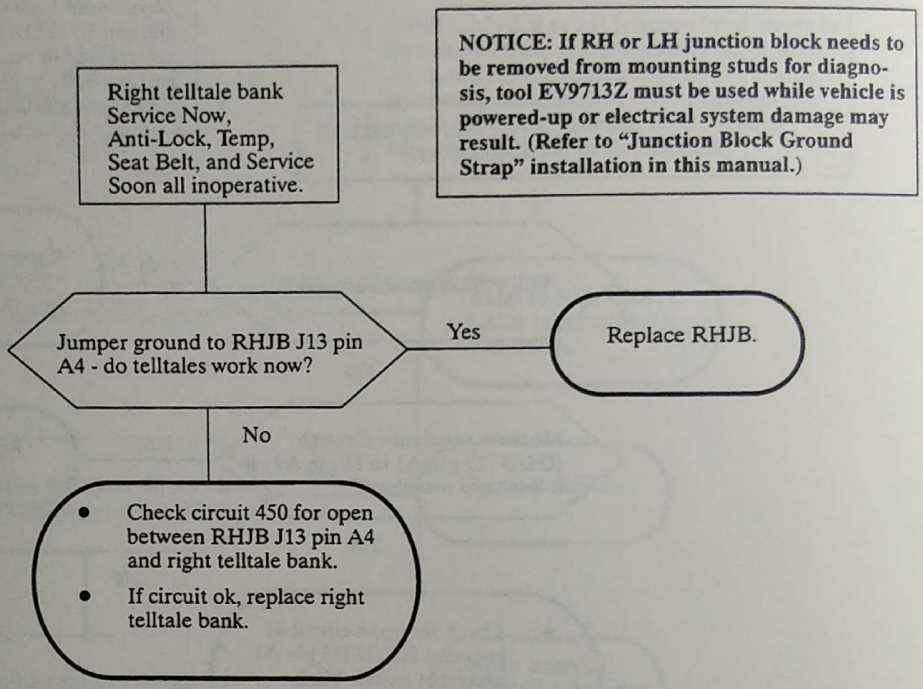
RIGHT TELLTALE BANK SERVICE NOW, ANTI-LOCK, TEMP, SEAT BELT AND SERVICE SOON ALL INOPERATIVE

CHART 18



NOTES

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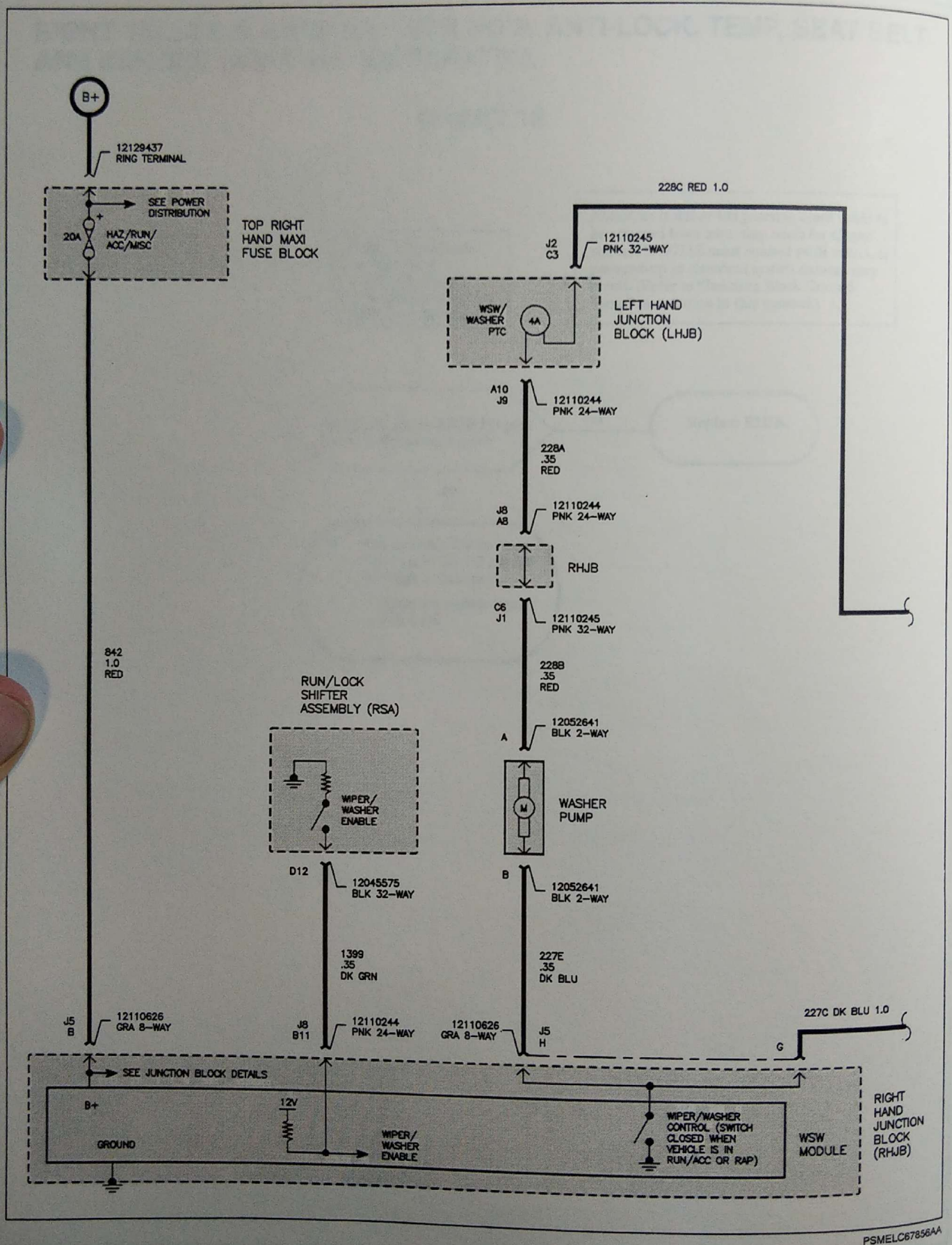
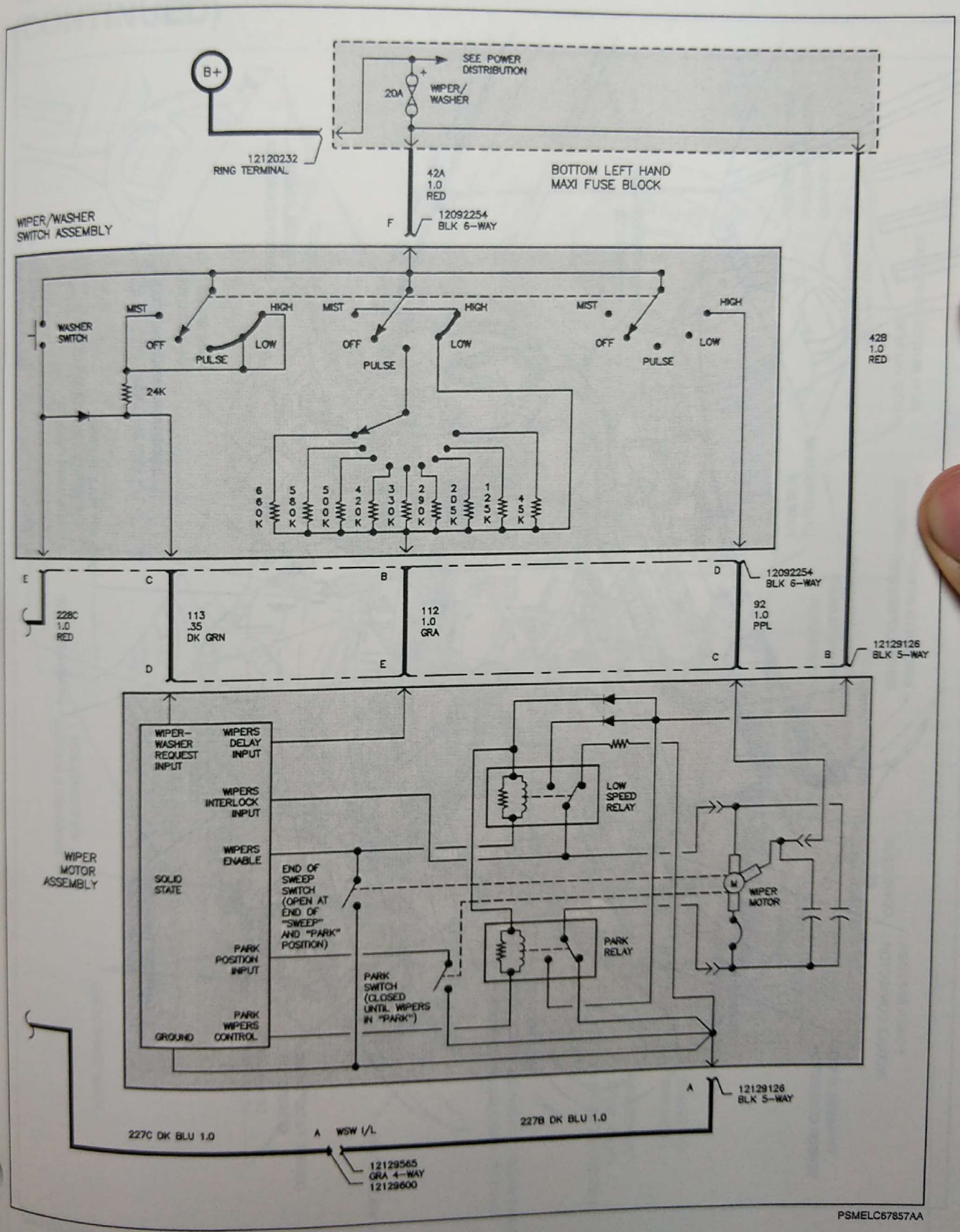
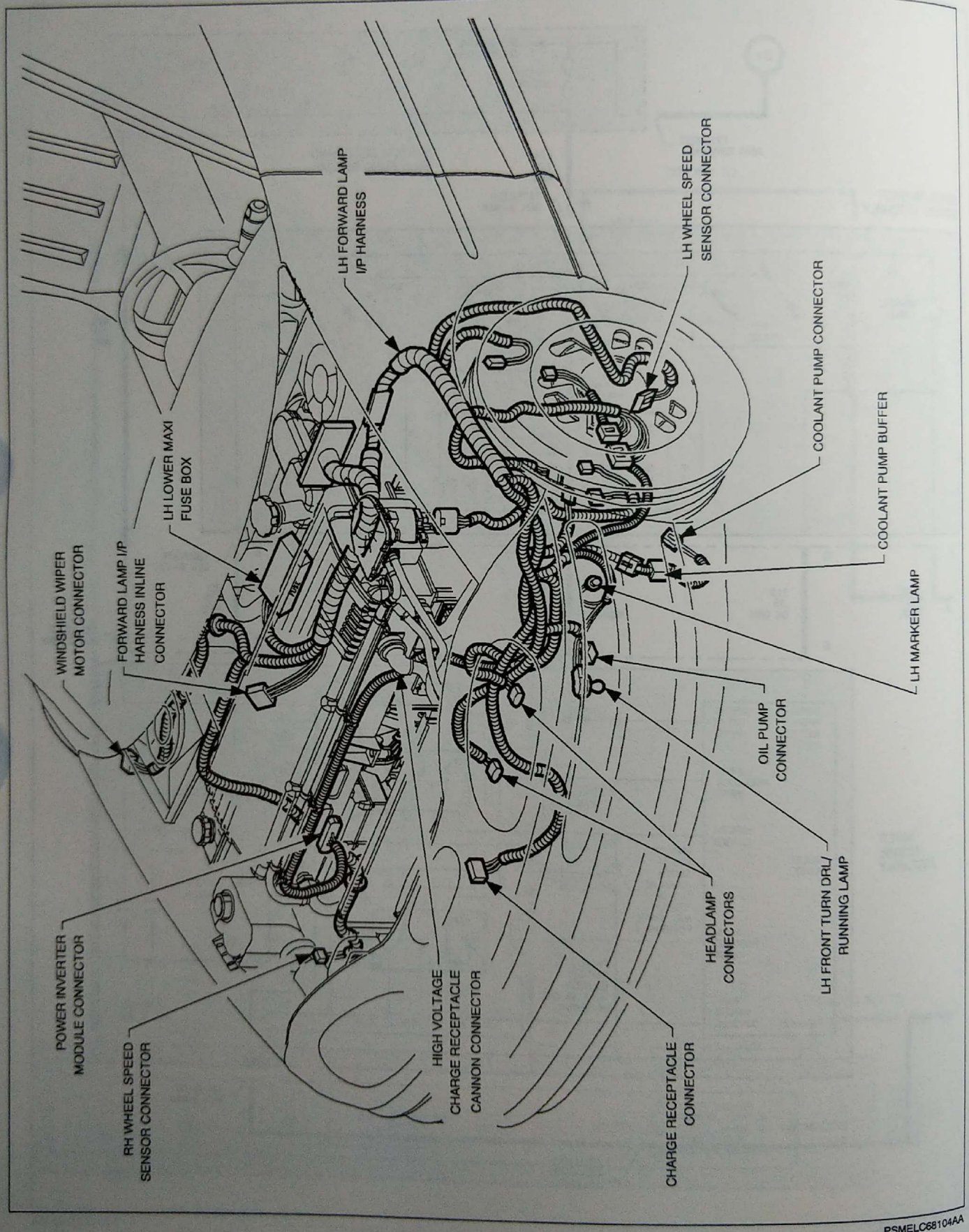
WINDSHIELD WIPER




B+
12120232
RING TERMINAL
SEE POWER DISTRIBUTION
20A
WIPER/ WASHER
42A
1.0
RED
BOTTOM LEFT HAND
MAXI FUSE BLOCK
F
12092254
BLK 6-WAY
WIPER/WASHER
SWITCH ASSEMBLY
WASHER SWITCH
MIST
OFF
HIGH
PULSE
LOW
24K
660K
580K
500K
420K
330K
290K
205K
125K
45K
42B
1.0
RED
E
C
B
D
12092254
BLK 6-WAY
228C
1.0
RED
113
.35
DK GRN
112
1.0
GRA
92
1.0
PPL
12129126
BLK 5-WAY
WIPER MOTOR ASSEMBLY
WIPER-WASHER REQUEST INPUT
WIPERS DELAY INPUT
WIPERS INTERLOCK INPUT
WIPERS ENABLE
SOLID STATE
END OF SWEEP SWITCH (OPEN AT END OF "SWEEP" AND "PARK" POSITION)
PARK POSITION INPUT
PARK SWITCH (CLOSED UNTIL WIPERS IN "PARK")
PARK WIPERS CONTROL
GROUND
LOW SPEED RELAY
PARK RELAY
WIPER MOTOR
M
A
12129126
BLK 5-WAY
227C DK BLU 1.0
A
WSW I/L
227B DK BLU 1.0
12129565
GRA 4-WAY
12129600
PSMELC67857AA

WINDSHIELD WIPER COMPONENT LOCATION VIEWS



WINDSHIELD WIPER COMPONENT LOCATION VIEWS (CONTINUED)

PSMELC68103AB

WINDSHIELD WIPER/WASHER SYSTEM

GENERAL DESCRIPTION

The windshield wiper/washer system consists of a permanent magnet positive park wiper motor assembly, a transmission assembly, wiper arm and blade assemblies, a washer pump mounted on a washer solvent container and a wiper/washer switch assembly. The wiper motor assembly has HIGH, LOW, MIST and DELAY modes. The pulse and demand wash functions are controlled by a plug-in printed circuit board assembly enclosed in the wiper motor housing cover.

WIPER OPERATION

In the LOW position, the wiper switch supplies battery voltage to the GRA wire and the pulse/speed/wash control grounds the park/run relay which closes its contacts, supplying voltage to the low speed brush of the wiper motor. The wipers run at low speed.

With the wiper switch in HIGH position, battery voltage is supplied from the PPL wire directly to a second armature terminal of the wiper motor. The wipers run at high speed. When the wiper switch is turned to OFF, the wipers complete the last sweep at low speed and return to park position.

When the wiper switch is first turned to OFF, battery voltage is still applied to the wiper motor through the contacts of the park/run relay. When the wipers reach park position, the park/run relay opens and shunts the wiper motor to stop it quickly. The wiper blades remain in park position.

When the wiper switch is moved to MIST and released, the wipers make one sweep at low speed and return to park position. The circuit operation is the same as low speed.

With the wiper switch in DELAY (pulse), battery voltage is applied to the GRA wire and the solid state pulse/speed/wash control. The pulse/speed/wash control momentarily supplies ground to the park/run relay which closes its contacts, applying voltage to the wiper motor. When the wipers return to park position, the park/run switch opens and ground is removed from the park/run relay. The wipers remain in park until the pulse/speed/wash control again supplies ground to the park/run relay to start another sweep. The delay time between sweeps is controlled by the rheostat and can be adjusted from 0 to 20 seconds.

PULSE SYSTEM

In the pulse operating mode the wipers make single sweeps with an adjustable time interval between sweeps. The time interval is controlled by a solid state pulse/speed/wash control in the wiper motor assembly. The duration of the delay interval is determined by the delay rheostat in the wiper/washer switch assembly. The wiper motor has a built-in self-resetting circuit breaker which opens to protect the wiper motor when the wipers are blocked (by ice on the windshield, for example). The circuit breaker will reset when it cools.

WASHER OPERATION

When the washer switch is activated, battery voltage is applied to the pulse/speed/wash control. The pulse/speed/wash control supplies battery voltage to the washer pump through the right hand junction block (RHJB) and left hand junction block (LHJB). It also starts the wiper cycle through the low speed brush of the wiper motor. The washer pump continues to run as long as the switch is held down. The pulse/speed/wash control keeps the wipers on for approximately six seconds after the washer pump goes off. If the washer pump is switched On during pulse operation, the wipers run in low speed for six seconds. The wash cycle is completed before the wipers return to pulse operation.

GROUND CONTROL OF WIPER/WASHER

The run/lock shifter assembly (RSA) grounds circuit 1399 to the WSW module in the RHJB in RUN, ACCY, and RAP modes. When the windshield wiper/Washer (WSW) module receives a ground on circuit 1399, it provides a ground to circuits 227 and 5651 for the wiper and washer motors.

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DIAGNOSIS

TROUBLESHOOTING HINTS

Make the following checks before beginning system diagnosis.

1. Check wiper maxi fuse by visual inspection.
2. Check that wiper motor and wiper/washer switch connectors are mated correctly.
3. Check that the wiper motor mounting screws are clean and tight.
4. If wiper motor assembly runs but wiper blades do not sweep the windshield, check wiper transmission at wiper motor crank arm.
5. If washer does not operate, check that:
   - Solvent container is filled.
   - Hoses are not pinched or kinked.
   - Hoses are correctly attached.
   - Nozzle is not clogged.

Refer to System Diagnosis.

SYSTEM DIAGNOSIS

Perform the pulse wiper/washer system check then refer to the appropriate symptom table for diagnostic procedures.

PULSE WIPER/WASHER SYSTEM CHECK

ACTION	NORMAL OPERATION
• Ignition switch in RUN • Hold washer switch ON for 1 to 2 seconds.	Washer sprays windshield as long as washer switch is held ON. Wipers run at low speed and continue to run for approximately 6 seconds after wash cycle is complete, then return to park position.
• Move wiper switch to HIGH. • Hold washer switch ON for 1 to 2 seconds.	Same operation as low speed wash except that wipers run at high speed.
• Move wiper switch to DELAY (pulse mode). • Adjust delay time by moving wiper switch through delay range.	Wipers make one complete sweep, then pause for 0 to 20 seconds before making next sweep.
• Wiper switch in DELAY. • Hold washer switch ON for 1 to 2 seconds.	Washer sprays as long as washer switch is held ON. Wipers run at low speed during spray period and continue for approximately 6 seconds after wash cycle. Wipers return to pulse mode.
• Move wiper switch to LOW.	Wipers run continuously at low speed.
• Move wiper switch to HIGH.	Wipers run continuously at high speed.
• Move wiper switch to OFF.	Wipers return to park position at low speed.
• Move wiper switch to MIST, then release.	Wipers make one complete sweep at low speed and then park.

Symptom Table For Pulse System

SYMPTOM	PROCEDURE
Wipers do not operate in any mode.	Chart 1
Wipers run at high speed (low speed/delay inoperative)	Chart 2
Wipers run at low speed only (high speed inoperative)	Chart 3
Wipers will not turn off.	Chart 4
Wipers enabled at all times (with rap off in lock mode)	Chart 5
Wipers cut out intermittently in low or high speed settings (current draw test).	Chart 6
Pulse delay operates incorrectly or is inoperative. (Low and High work ok.)	Chart 7
Washer pump will not operate.	Chart 8

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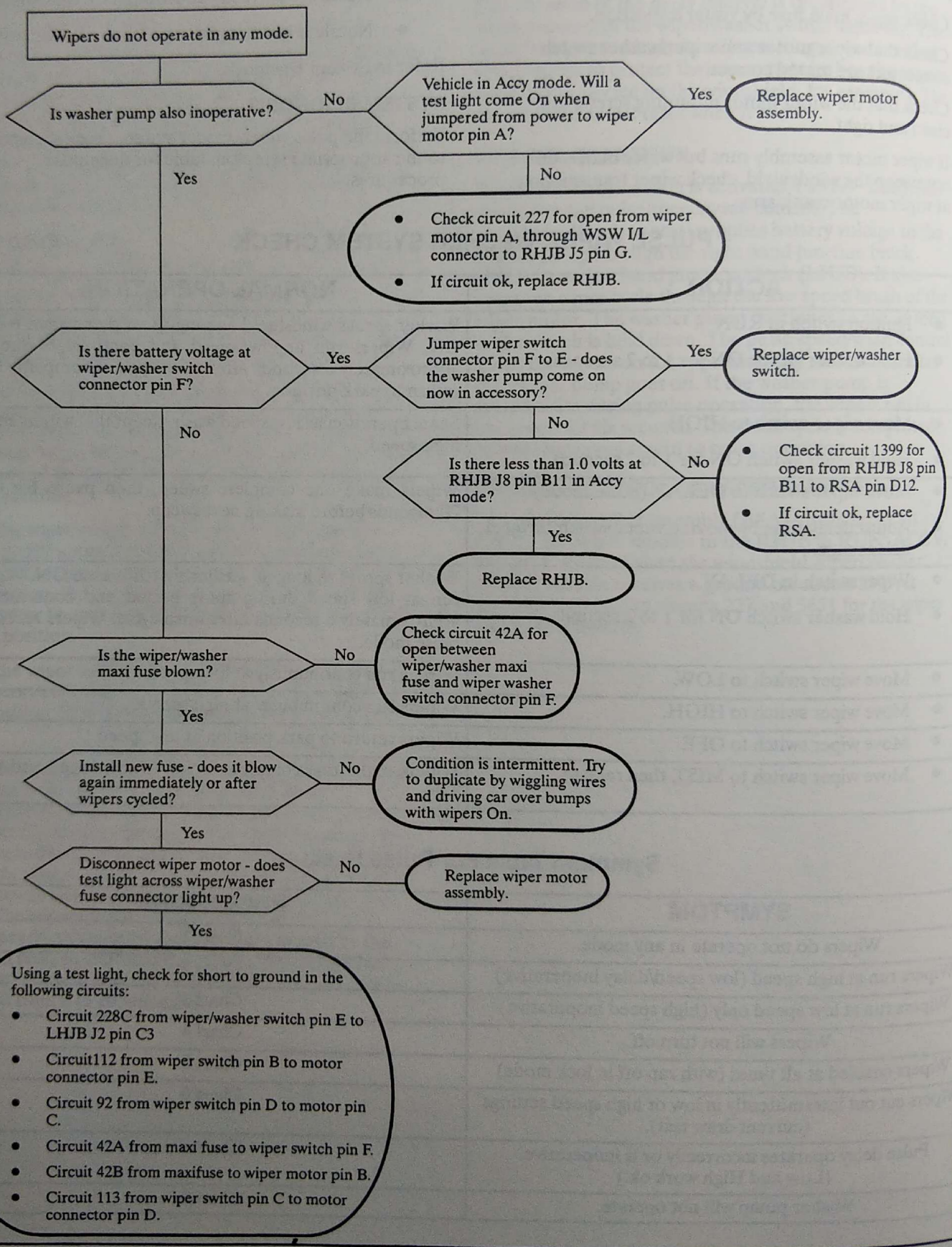
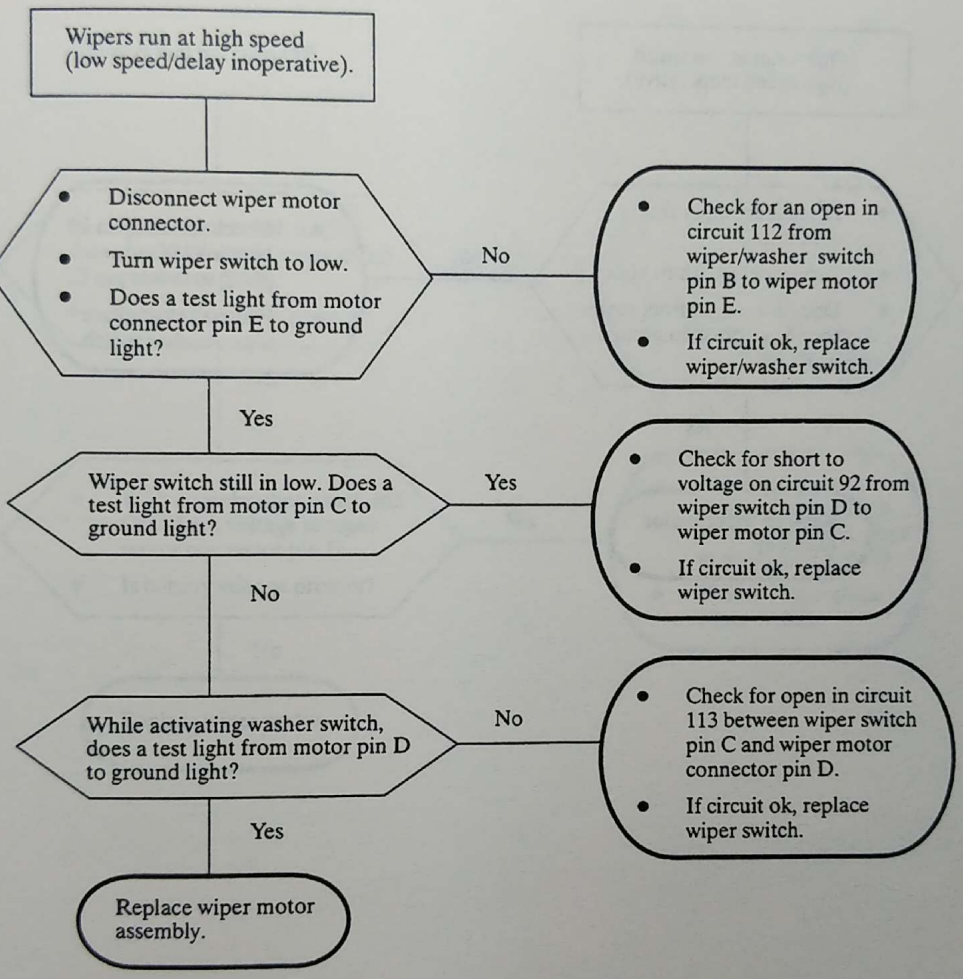
WIPERS DO NOT OPERATE IN ANY MODE
CHART 1



WIPERS RUN AT HIGH SPEED (LOW SPEED/DELAY INOPERATIVE)

CHART 2



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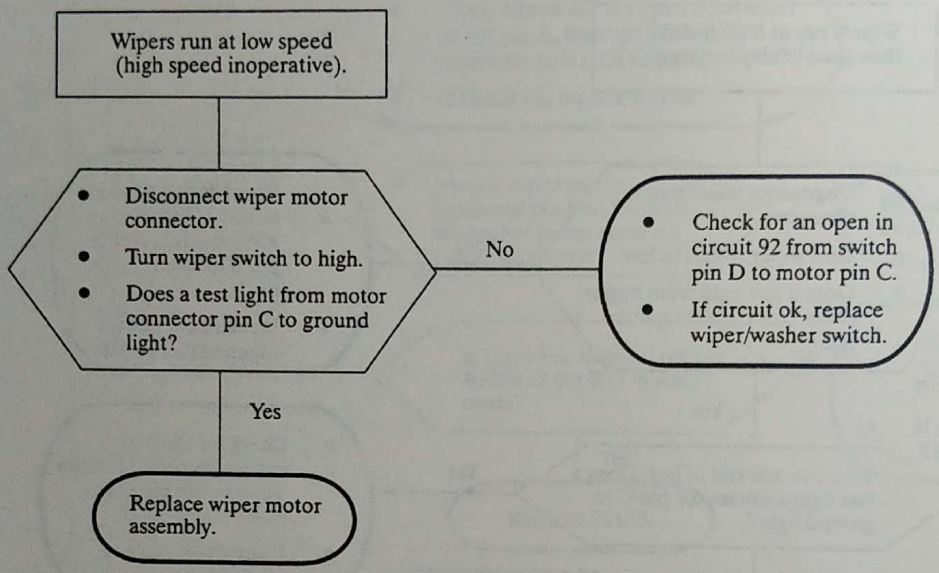
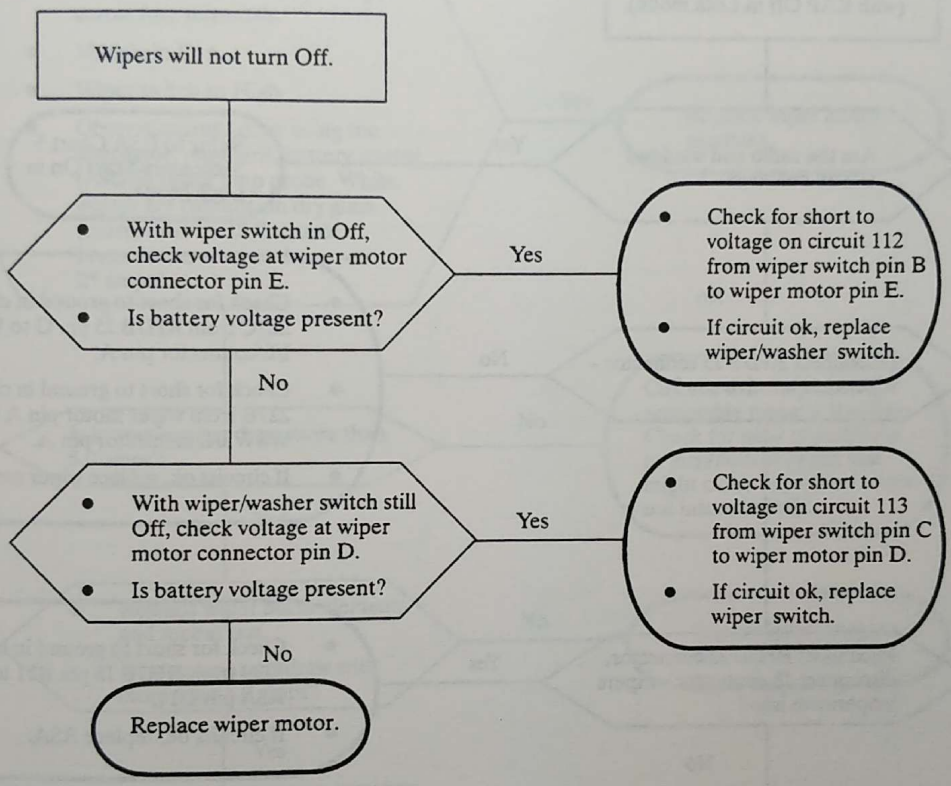
WIPERS RUN AT LOW SPEED (HIGH SPEED INOPERATIVE)

CHART 3



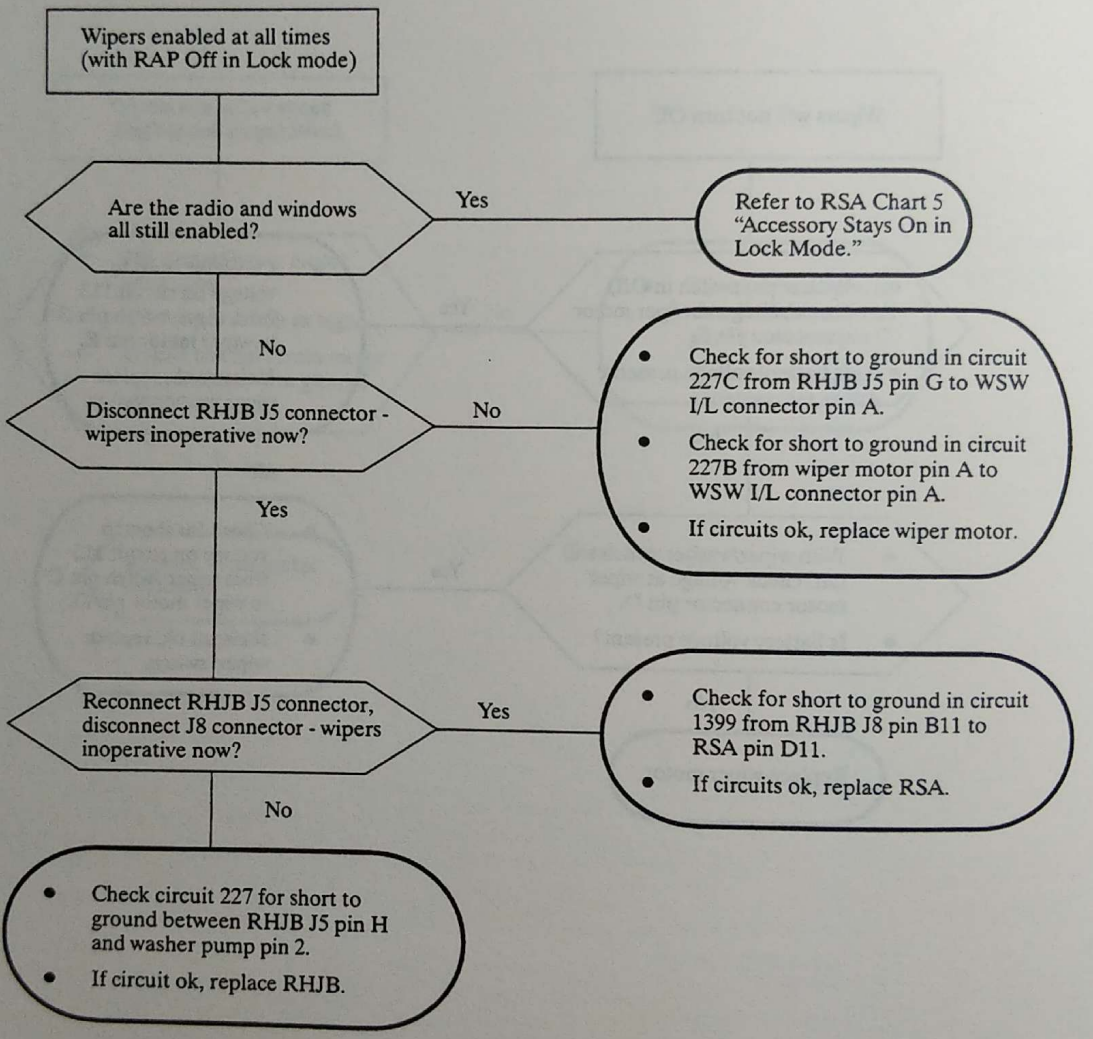
WIPERS WILL NOT TURN OFF

CHART 4



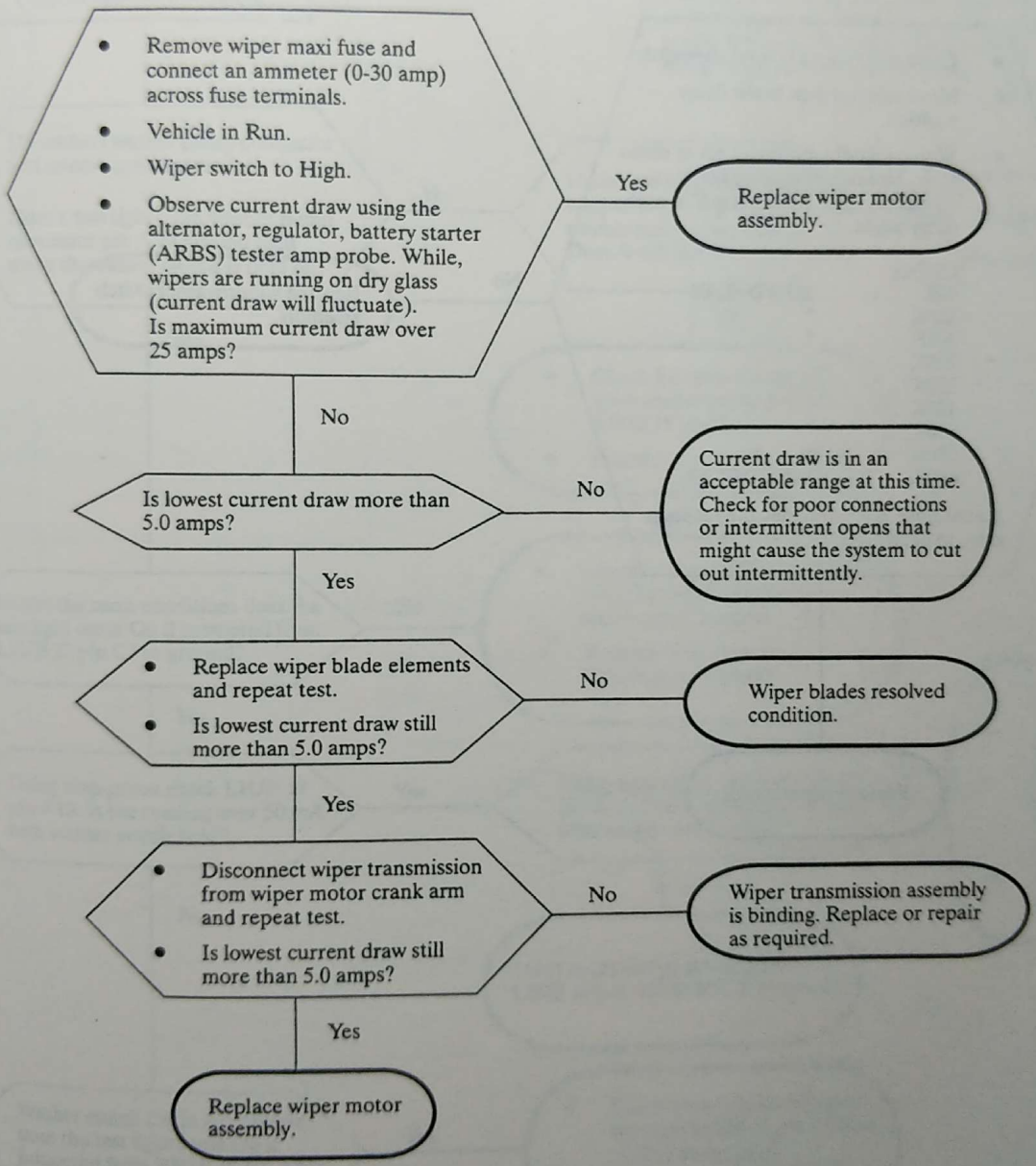
WIPERS ENABLED AT ALL TIMES (WITH RAP OFF IN LOCK MODE)

CHART 5



WIPERS CUT OUT INTERMITTENTLY AT LOW OR HIGH SPEED SETTINGS (CURRENT DRAW TEST)

CHART 6



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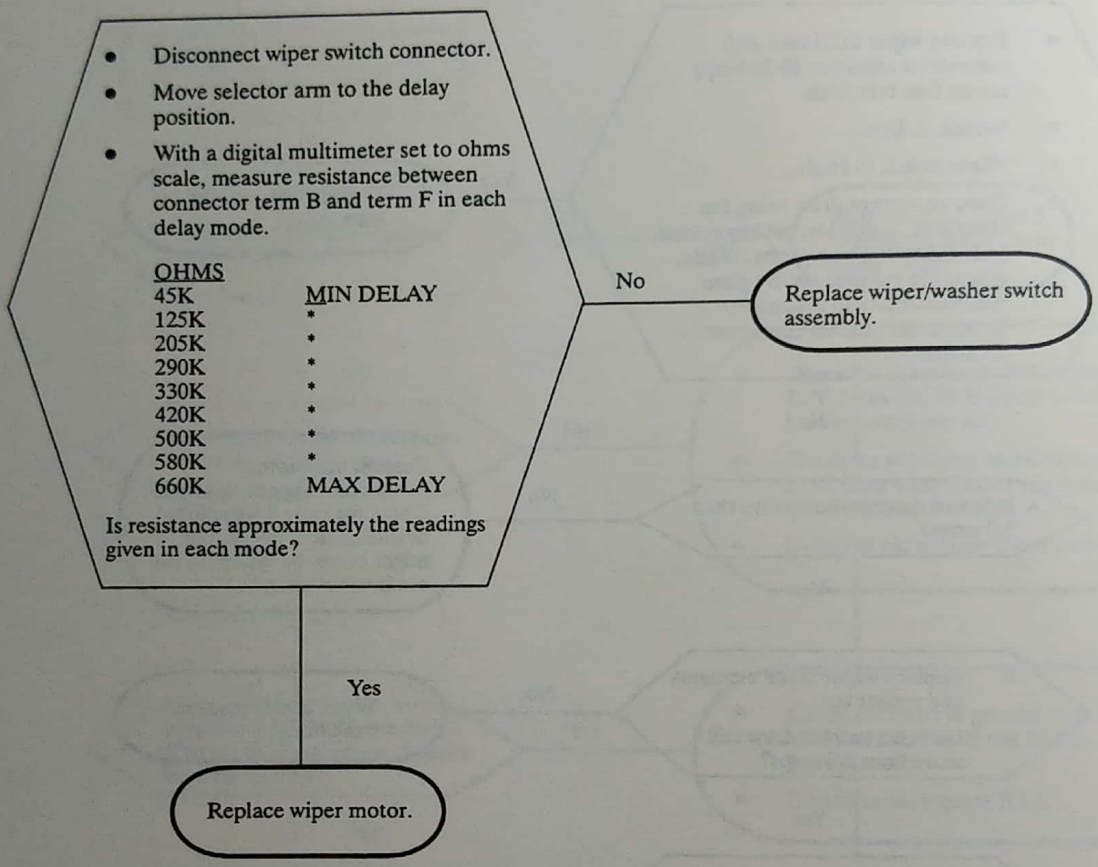
PULSE DELAY OPERATES INCORRECTLY OR IS INOPERATIVE (LOW AND HIGH WORK OK)

CHART 7



WASHER PUMP WILL NOT OPERATE

CHART 8

Washer pump will not operate. (Wipers operate normally).

NOTICE: If RH or LH junction block needs to be removed from mounting studs for diagnosis, tool EV9713Z must be used while vehicle is powered-up or electrical system damage may result. (Refer to "Junction Block Ground Strap" installation in this manual.)

Disconnect washer pump connector and select accessory mode.

Does a test light from washer pump connector pin A to ground light when the washer switch is held on?

Yes → Under the same conditions, jumper the testlight across washer pump pins A and B. Does it still light?

Yes → Replace washer pump.

No → Check for open circuit 227 from washer pump pin 2 to RHJB J5 pin H.
- If circuit is ok, replace RHJB.

No

Under the same conditions does the test light come On if jumpered from LHJB J2 pin C3 to ground?

No → Check circuit 228C from LHJB J2 pin C3 to wiper/washer switch pin E for open.
- If circuit is ok, replace wiper/washer switch.

Yes

Using amp probe check LHJB J9 pin A10. Is the reading over 50 mA with washer switch held?

Yes → Using amp probe check RHJB J8 pin A8. Is the reading over 50 mA with washer switch held?

Yes → Check for short to ground in circuit 228B from RHJB J1 pin C6 to washer pump pin 1.
- If circuit is ok, replace RHJB.

No → Short to ground in circuit 228A from LHJB J9 pin A10 to RHJB J8 pin A8.

No

Washer switch On in Accy mode - does the test light come On if jumpered from RHJB J8 pin A8 to ground?

Yes → Check circuit 228B for open between RHJB J1 pin C6 and washer pump pin 1.
- If circuit is ok, replace RHJB.

No → Check circuit 228A for open between LHJB J9 pin A10 and RHJB J8 pin A8.
- If circuit is ok, replace LHJB.

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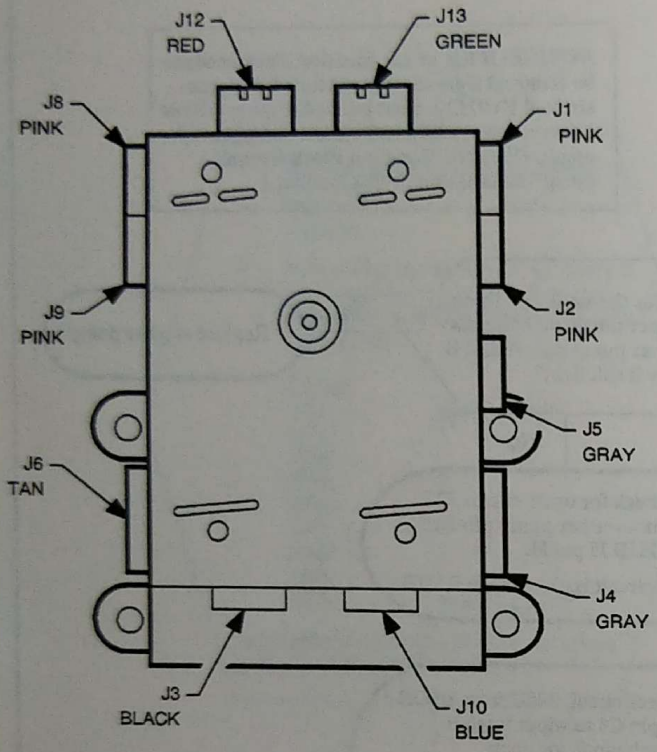
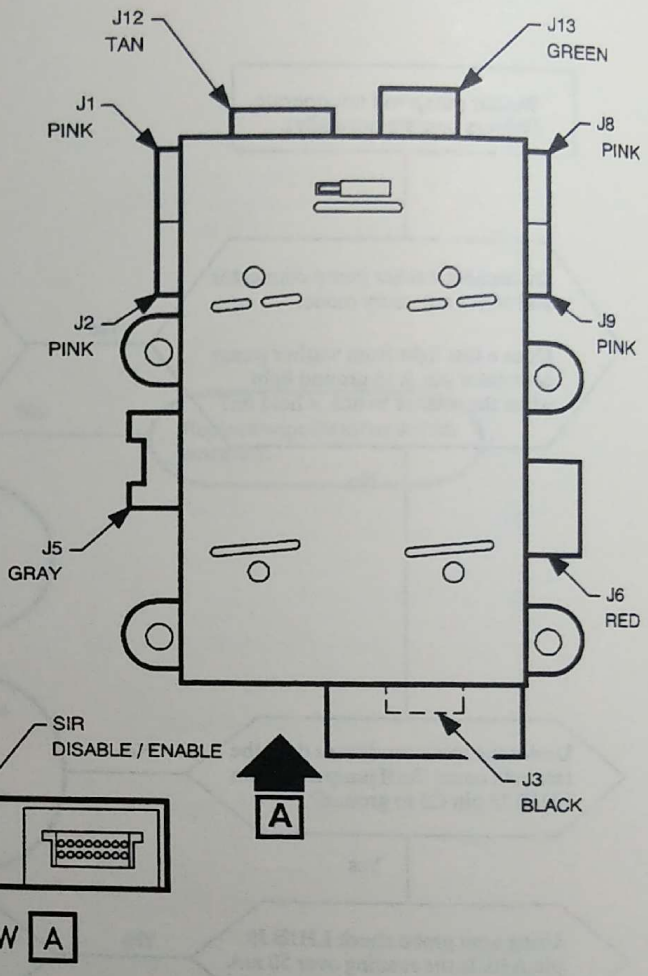
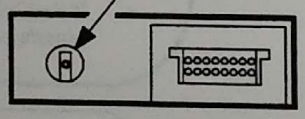
JUNCTION BLOCK CONNECTOR LOCATIONS

LH JUNCTION BLOCK



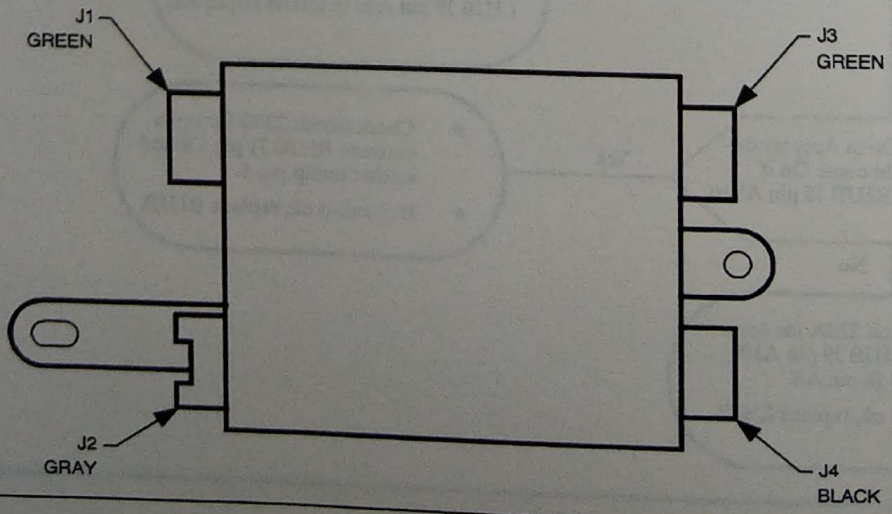
RH JUNCTION BLOCK





VIEW A

TRUNK JUNCTION BLOCK



PSMELC68272AA

NOTES

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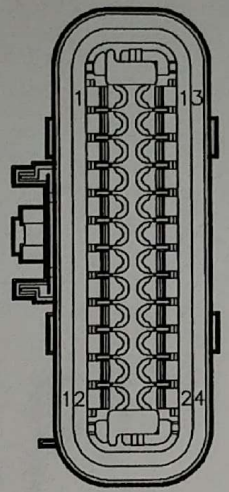
HARNESS CONNECTOR FACES

ACCESSORY AC AND DC POWER MODULE (APM)



NATURAL
12129225

Location: Underhood, Left Side of Accessory Power Module

PSMELC67235AA

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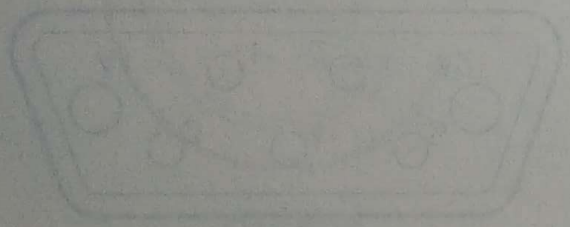
ACCESSORY AC AND DC POWER MODULE – 12129225

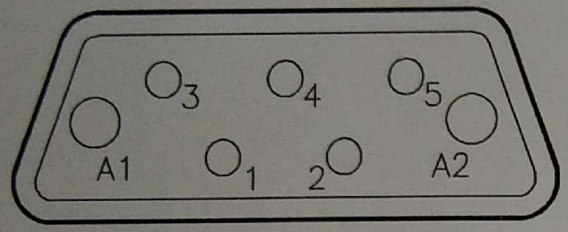
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	BRN	241B	.35	RUN 2
2	WHT	249	.35	AUX POWER SUPPLY (APS) COMMAND IN
3				
4	BLK/WHT	1085	.35	CMC SPEED COMMAND IN
5	RED	1262	.35	APM 12V STATUS BIT 0
6	PPL	1645	.35	BRAKE LOAD SHED
7	ORN	1263	.35	APM 12V STATUS BIT 1
8	PNK/BLK	1217	.35	CMC DC CURRENT
9	DR GRN	1264	.35	APM 12V STATUS BIT 2
10				
11				
12				
13	YEL	820C	.35	BRAKE SWITCH IN
14				
15	WHT	637	.35	HEATED W/S COMMAND IN
16				
17				
18	DK BLU	1081	.35	CMC/47V STATUS BIT 0
19	YEL	1082	.35	CMC/47V STATUS BIT 1
20	PPL	1083	.35	CMC/47V STATUS BIT 2
21				
22				
23				
24	WHT	2027C	.35	VEHICLE WAKE–UP



CamScanner

HARNESS CONNECTOR FACES

ACCESSORY POWER MODULE (APM)



BLINDMATE

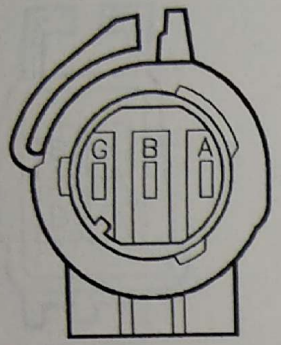
PSMELC68244AA

ACCESSORY POWER MODULE (APM)				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1				HV BATT +
1				HV INTERLOCK RETURN –
2				
3				
4				
5				HV INTERLOCK +
A2				HV BATT –

Location: Underhood, Attached to Lower Left of Power Electronics Bay

CamScanner

BACKUP LAMP



PSMELC67204AA

NATURAL
12160394

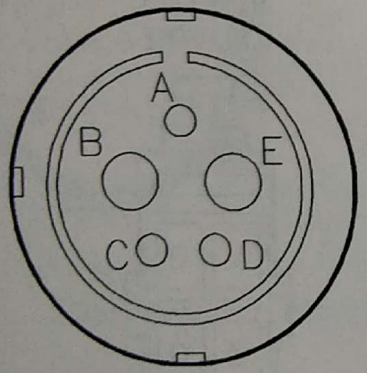
LEFT BACKUP LAMP – 12160394				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN	24G	.50	BACKUP LAMP HI
B				
G	BLK	150GG	.50	GROUND

Location: Exterior, Behind Turn/Stop/Back–up Lamp Housing

RIGHT BACKUP LAMP – 12160394				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN	24F	.50	BACKUP LAMP HI
B				
G	BLK	150G	.50	GROUND

Location: Exterior, Behind Turn/Stop/Back-Up Lamp Housing

BATTERY PACK



CANNON
CONNECTOR

PSMELC68240AA

BATTERY PACK CANNON CONNECTOR				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				
B				HV–
C				HV INTERLOCK RETURN (–)
D				HV INTERLOCK (+)
E				HV (+)

Location: Underhood, Rear of Power Electronics Bay

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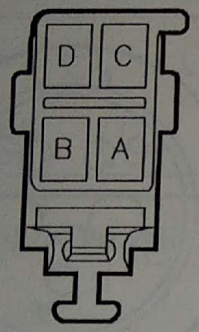
HARNESS CONNECTOR FACES

BATTERY PACK FAN INLINE – FEMALE CONNECTOR



BLACK
12129136

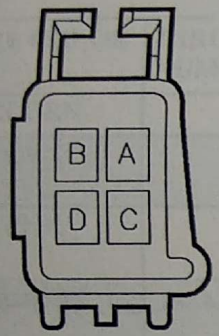
PSMELC67252AA

BATTERY PACK FAN INLINE – 12129136				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	150L	1.0	GROUND
B	WHT	108C	.35	BATTERY PACK FAN CONTROL
C	RED	1142C	3.0	B+
D				

Location: Right Side of Trunk Compartment, Under Carpet

CamScanner

BATTERY PACK FAN INLINE – MALE CONNECTOR



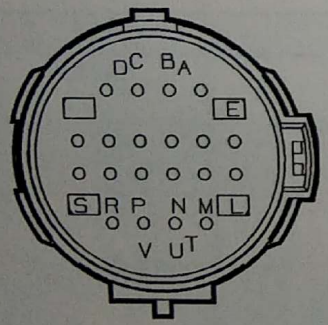
BLACK
12129135

PSMELC67210AA

BATTERY PACK FAN INLINE – 12129135				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	150K	3.0	GROUND
B	WHT	108E	.35	BATTERY PACK FAN CONTROL
C	RED	1142E	3.0	B+
D				

Location: Right Side of Trunk Compartment, Under Carpet

BATTERY PACK INLINE



GRAY
12160544

PSMELC67244AA

BATTERY PACK INLINE – 12160544				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	840B	.35	B+
B	BRN	41S	.35	RUN 1
C	LT GRN	275B	.35	PARK SELECT IN
D	WHT	26B	.35	AUTO DISCONNECT POWER SUPPLY
E	WHT	2027F	.35	VEHICLE WAKE-UP
L	PNK	213B	.35	CHARGE PORT TEMP IN
M	PPL	1807B	.35	CLASS 2 DATA
N	ORN	7K	.35	RUN 1 / WAKE-UP
P	TAN	800G	.35	SERIAL DATA
R	WHT	249	.35	AUXILIARY POWER SUPPLY COMMAND OUT
S	BLK	350E	.35	GROUND
T	WHT	108B	.35	BATT PACK FAN CONTROL OUT
U	BLK	350K	.35	GROUND
V	BLK	350S	.35	GROUND

Location: Underhood, Center Front of Dash

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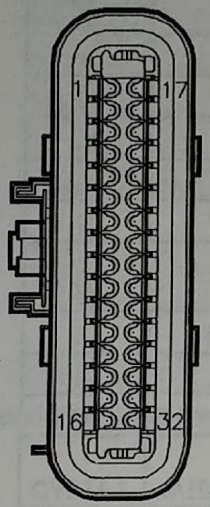
BATTERY PACK MODULE (J1)



12129025
WITH RED RETAINER

Location: Underbody in Battery Pack

PSMELC68237AA

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BATTERY PACK MODULE – J1 – 12129025

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	LT GRN			BATT. PACK HI
2	ORN			BATT. MODULE 2 VOLTAGE
3	PNK			BATT. MODULE 4 VOLTAGE
4	DK GRN			BATT. MODULE 6 VOLTAGE
5	DK BLU			BATT. MODULE 8 VOLTAGE
6	DK BLU/WHT			BATT. MODULE 10 VOLTAGE
7	YEL			BATT. MODULE 12 VOLTAGE
8	BLK			SHUNT LO
9	BLK			BATT. MODULE 14 VOLTAGE
10	GRA			BATT. MODULE 16 VOLTAGE
11	TAN			BATT. MODULE 18 VOLTAGE
12	PPL/WHT			BATT. MODULE 20 VOLTAGE
13	GRA			BATT. MODULE 22 VOLTAGE
14	YEL			BATT. MODULE 24 VOLTAGE
15	DK BLU			BATT. MODULE 26 VOLTAGE
16				
17	PPL			BATT. MODULE 1 VOLTAGE
18	WHT			BATT. MODULE 3 VOLTAGE
19	BLK			BATT. MODULE 5 VOLTAGE
20	TAN			BATT. MODULE 7 VOLTAGE
21	LT GRN			BATT. MODULE 9 VOLTAGE
22	DK GRN			BATT. MODULE 11 VOLTAGE
23	WHT			SHUNT HI
24	RED			BATT. MODULE 13 VOLTAGE
25	PPL			BATT. MODULE 15 VOLTAGE
26	DK BLU/WHT			BATT. MODULE 17 VOLTAGE
27	BRN			BATT. MODULE 19 VOLTAGE
28	LT BLU			BATT. MODULE 21 VOLTAGE
29	LT GRN			BATT. MODULE 23 VOLTAGE
30	BRN			BATT. MODULE 25 VOLTAGE
31	TAN			BATT. MODULE 26 RETURN
32	LT BLU			BATTERY PACK LO

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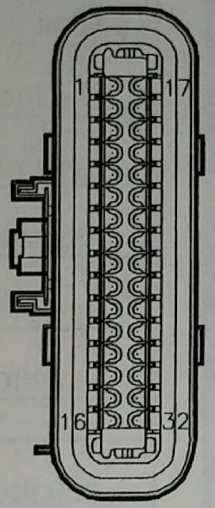
BATTERY PACK MODULE
(J2)



12129025
WITH CLEAR RETAINER

Location: Underbody, in Battery Pack

PSMELC68238AA

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BATTERY PACK MODULE – J2 – 12129025 (WITH RETAINER)

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	WHT			GROUND
2	PNK			RUN 1
3	GRA			B+
4	DK BLU			VEHICLE WAKE–UP
5				
6				
7	BLK			PARK SELECT
8	BLK			AD STATE "A"
9	LT BLU			AD STATE "B"
10	BRN			AD STATE "C"
11	DK GRN			AD COMMAND
12	WHT			APS COMMAND
13	PNK			AD POWER SUPPLY
14	TAN			BATT PACK FAN CONTROL
15			–	–
16	YEL			GROUND
17	–	–	–	–
18	GRA			CHARGE RECEPT TEMP
19	–	–	–	–
20	BLK			AIRFLOW DETECT INPUT
21	–	–	–	–
22	LT BLU			MODULE 9 TEMP
23	GRA			MODULE 10 TEMP
24	DK GRN			MODULE 4 TEMP
25	LT GRN			MODULE 6 TEMP
26	PNK			MODULE 1 TEMP
27	PPL			MODULE 3 TEMP
28	TAN			INLET AIR TEMP
29	WHT			GROUND
30	ORN			CLASS 2 DATA
31	DK BLU			GROUND
32	DK GRN			SERIAL DATA

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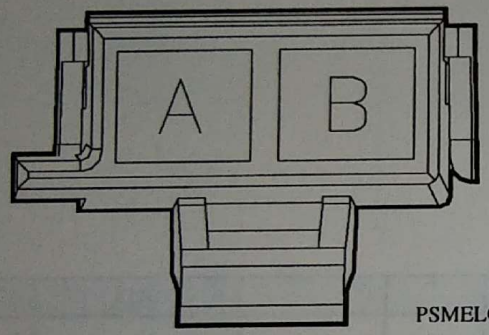
HARNESS CONNECTOR FACES

BATTERY RECOVERY SWITCH (BRS)



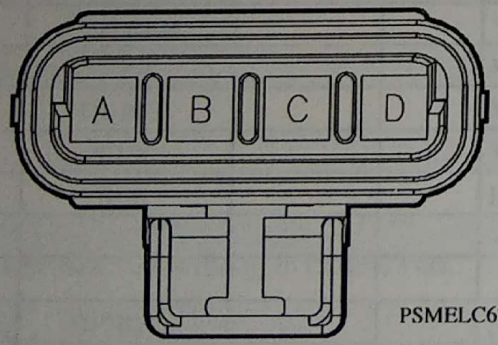
PSMELC67223AA

GRAY
12034341

BATTERY RECOVERY SWITCH – 12034341				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	26C	.35	AD POWER SUPPLY
B	WHT	2027E	.35	VEHICLE WAKE-UP

Location: Passenger Compartment, Under Right Side of I/P

BLOWER MOTOR MODULE



PSMELC67176AA

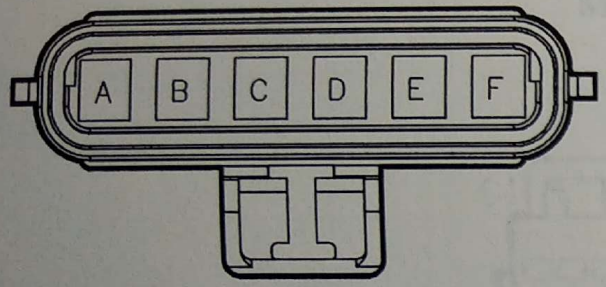
DARK GREY
12129565

BLOWER MOTOR MODULE – 12129565				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	350N	1.0	GROUND
B				
C	GRA/BLK	754	.35	BLOWER CONTROL IN
D	RED	1642	1.0	B+

Location: Passenger Compartment, In Heat Pump Ventilation Module Under Right Side of I/P

CamScanner

BRAKE PRESSURE MODULATOR



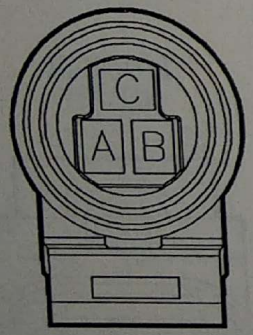
GRAY
12110295

PSMELC67567AA

BRAKE PRESSURE MODULATOR – 12110295				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	PPL	1282	3.0	RF MODULATOR HI
B	BLK	1283	3.0	RF MODULATOR LO
C				
D				
E	BLK	1280	3.0	LF MODULATOR HI
F	PNK	1281	3.0	LF MODULATOR LO

Location: Underhood – Bottom Of Brake Modulator

BRAKE PRESSURE SENSOR–DOWNSTREAM



BLACK
12110192

PSMELC67231AA

BRAKE PRESSURE SENSOR – LEFT FRONT – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK / WHT	407C	.35	GROUND
B	LT BLU / BLK	416H	.35	+5V REF
C	LT GRN	2037	.35	LF BRAKE PRESSURE SIGNAL

Location: Underhood – Lower Front Center

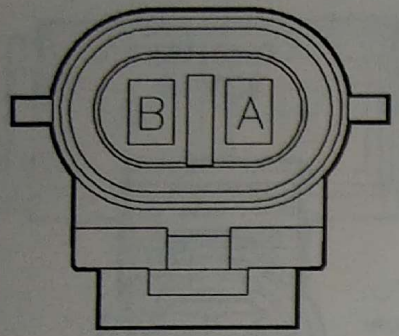
BRAKE PRESSURE SENSOR – RIGHT FRONT – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	407G	.35	GROUND
B	GRA	416G	.35	+5V REF
C	LT BLU	2036C	.35	RF BRAKE PRESSURE SIGNAL

Location: Underhood – Right Side Front Of Dash

CamScanner

HARNESS CONNECTOR FACES

BRAKE SOLENOID



BLACK
12052641

PSMELC67232AA

BRAKE SOLENOID – LEFT FRONT – 12052641				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	LT BLU	1289	.50	TO RF ABS SOLENOID
2	DK GRN	1288	.50	ABS SOLENOID CONTROL

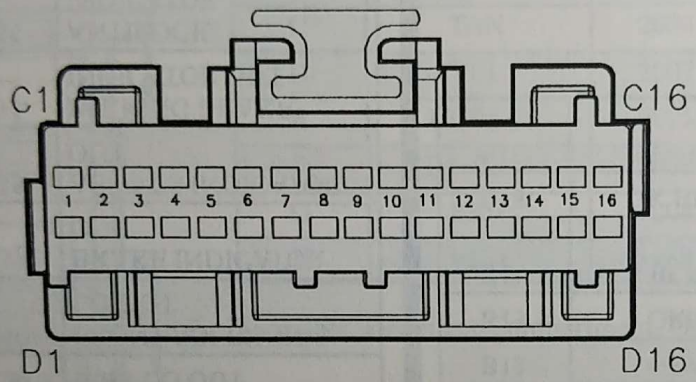
Location: Underhood – Top of Brake Modulator

BRAKE SOLENOID – RIGHT FRONT – 12052641				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	RED	1633E	.50	ABS SOLENOID B+
2	LT BLU	1289	.50	TO LF ABS SOLENOID

Location: Underhood – Top of Brake Modulator

CamScanner

BRAKE TORQUE CONTROLLER MODULE (BTCM) – J1



DK RED
12110113

Location: Passenger Commpartment, Under Left Side of I/P

PSMELC66035AA

CamScanner

HARNESS CONNECTOR FACES

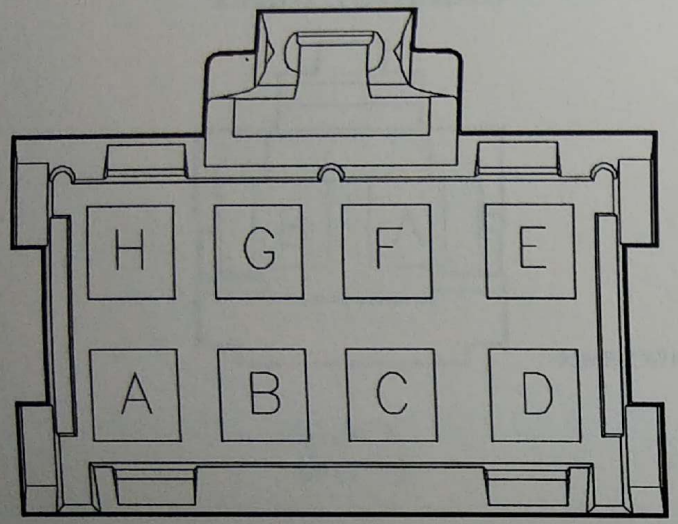
BRAKE TORQUE CONTROLLER MODULE – J1 – 12110113

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BLK	407F	.35	MC2 LO
A2	TAN	800E	.35	TO LH JUNCTION BLOCK SERIAL DATA
A3	YEL	873	.80	LF WSS LO IN
A4	TAN	833	.80	RF WSS LO IN
A5	GRA	2035	.35	MC2 IN
A6	LT BLU	2036B	.35	RF BRAKE PRESSURE SENSOR IN
A7	RED	885B	.35	LR WSS LO IN
A8	BRN	882B	.35	RR WSS HI IN
A9	PNK	2031	.35	PARK BRAKE SWITCH IN
A10	LT BLU	1134	.35	PARK BRAKE SWITCH IN
A11	LT GRN	1286	.50	EMB LO OUT
A12	DK GRN	1288	.50	FRONT SOLENOIDS LO OUT
A13	TAN/WHT	33	.35	BRAKE INDICATOR OUT
A14	DK BLU	1660B	.35	ABS/TCS INDICATOR OUT
A15	DK BLU / WHT	1934	.35	PARKING BRAKE INDICATOR OUT
A16	WHT	852B	.35	ANTILOCK INDICATOR

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
B1	PPL	2017	.35	RETARD REQUEST OUT
B2	DK BLU	2038	.35	RETARD ACHIEVED IN
B3	LT BLU	830	.80	LF WSS HI IN
B4	DK GRN	872	.80	RF WSS HI IN
B5	YEL	2034	.35	MC1 IN
B6	LT GRN	2037	.35	LF BRAKE PRESSURE SENSOR IN
B7	BLK	884B	.35	LR WSS HI
B8	WHT	883B	.35	RR WSS LO IN
B9	YEL	820E	.35	BRAKE SWITCH IN
B10	BLK	407A	.35	GROUND
B11	BRN	41E	.35	BTCM RUN 1
B12	GRA	416A	.35	5V REF OUT
B13	ORN	2540	.35	BTCM B+
B14	BLK	2015	.35	REAR BRAKE ENABLE RELAY OUT
B15	DK BLU	2021	.35	REGEN DISABLE OUT
B16	PNK	1632	.35	FRONT BRAKE ENABLE RELAY OUT

CamScanner

BRAKE TORQUE CONTROLLER MODULE (BTCM) – J2



LT GRAY
12110626

PSMELC66036AA

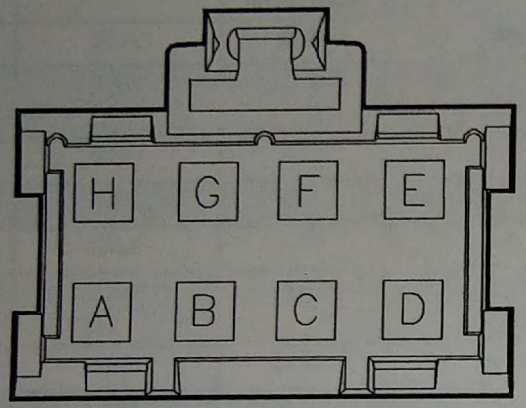
BRAKE TORQUE CONTROLLER MODULE – J2 – 12110626				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	2001	.80	LR PARK MOTOR HI OUT
B	TAN	2003	.80	LR PARK MORROR LO OUT
C	TAN	2004	.80	RR PARK MOTOR LO OUT
D	YEL	2007	.80	LR APPLY MOTOR LO OUT
E	LT BLU	2005	.80	LR APPLY MOTOR HI OUT
F	DK GRN	2006	.80	RR APPLY MOTOR LO OUT
G	BRN	2008	.80	RR APPLY MOTOR HI OUT
H	RED	1988	.80	RR PARK MOTOR HI OUT

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

HARNESS CONNECTOR FACES

BRAKE TORQUE CONTROLLER MODULE (BTCM) – J3



BLACK
12129088

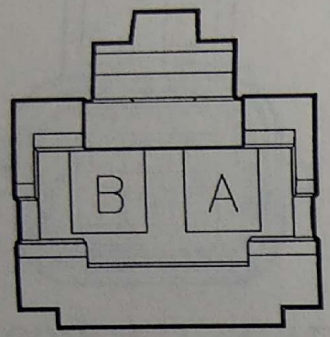
PSMELC66037AA

BRAKE TORQUE CONTROLLER MODULE – J3 – 12129088				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	2033	3.0	REAR BRAKE B+
B	PPL	1282	3.0	RF MOTOR HI OUT
C	BLK	1280	3.0	LF MOTOR HO OUT
D	BLK	450F	3.0	GROUND
E	BLK	450FF	3.0	GROUND
F	PNK	1281	3.0	LF MOTOR LO OUT
G	BLK	1283	3.0	RF MOTOR LO OUT
H	RED	1633B	3.0	FRONT BRAKE B+

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

CENTER HIGH MOUNTED STOP LAMP (CHMSL)



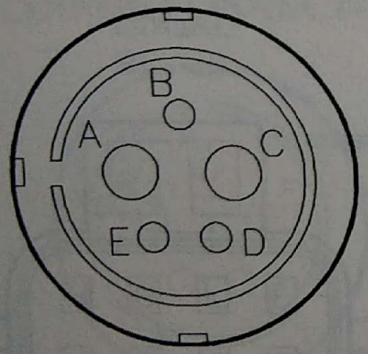
PSMELC67191AA

BLACK
8911772

CENTER HIGH MOUNTED STOP LAMP – 8911772				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	150B	.50	GROUND
B	YEL	820B	.50	CHMSL HI

Location: Trunk Compartment, Under Package Shelf

CHARGER RECEPTACLE



CANNON CONNECTOR

PSMELC68239AA

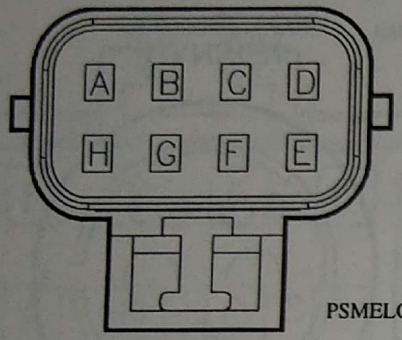
CHARGER RECEPTACLE CANNON CONNECTOR				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				HV (+)
B				
C				HV (–)
D				HV INTERLOCK RETURN (–)
E				HV INTERLOCK (+)

Location: Underhood, Left Side of Power Electronics Bay

CamScanner

HARNESS CONNECTOR FACES

CHARGER RECEPTACLE



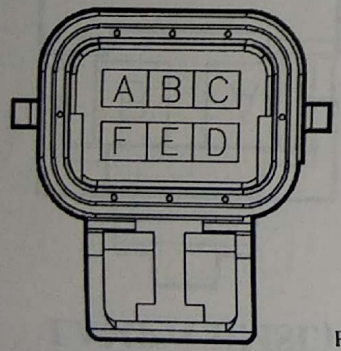
PSMELC67217AA

BLACK
12047937

CHARGER RECEPTACLE – 12047937				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	2740	.35	CHARGER COUPLER PRESENT SWITCH B+
B	DK GRN	2023	.35	CHARGER COUPLER PRESENT SWITCH OUT
C	PPL	1807E	.35	CLASS 2 DATA
D	PNK	213C	.35	CHARGER RECEPTACLE TEMP SENSOR HI
E	BLK	450EE	.35	GROUND
F				
G	WHT	2027G	.35	VEHICLE WAKE–UP
H	BLK	450H	.35	GROUND

Location: Front of Vehicle, Near Charge Receptical

CHARGER RECEPTACLE COOLANT VALVE



PSMELC67215AA

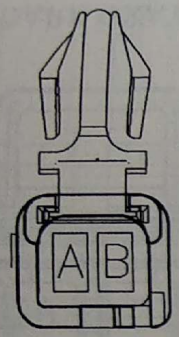
BLACK
12052848

CHARGER RECEPTACLE COOLANT VALVE – 12052848				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	7G	.35	RUN 1/WAKE–UP
B	TAN	134	.35	VALVE COMMAND IN
C	BLK/WHT	1704	.35	GROUND
D	GRA	605H	.35	+5V REF IN
E	BLK	212	.35	VALVE POSITION OUT
F				

Location: Left Front, Attached to Midrail

CamScanner

CHECK TIRE PRESSURE RESET SWITCH



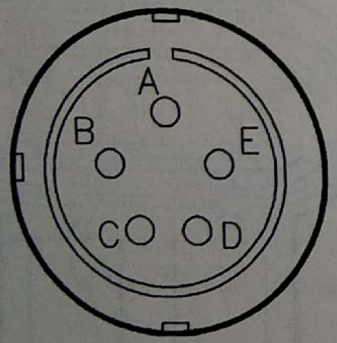
PSMELC67187AA

BLACK
12048457

CHECK TIRE PRESSURE RESET SWITCH – 12048457				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN	1055B	.35	SWITCH HI
B	BLK	150T	.35	GROUND

Location: Trunk Compartment, Under Deck Lid

COMPRESSOR MOTOR CANNON CONNECTOR



PSMELC68245AB

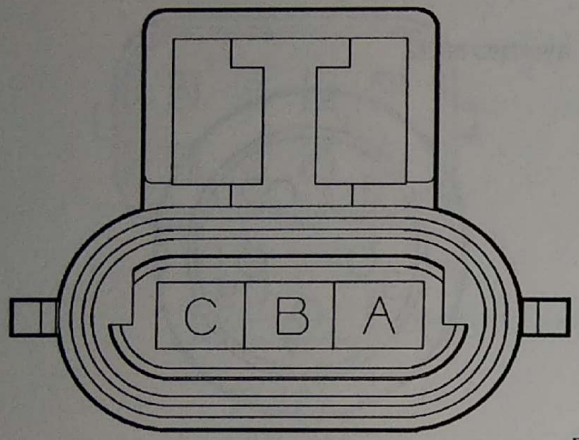
COMPRESSOR MOTOR CANNON CONNECTOR				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				PHASE A
B				PHASE B
C				PHASE C
D				CM INTLK
E				CM RTN

Location: Underhood, Attached to Lower Left of Power Electronics Bay

CamScanner

HARNESS CONNECTOR FACES

COOLANT LEVEL SENSOR



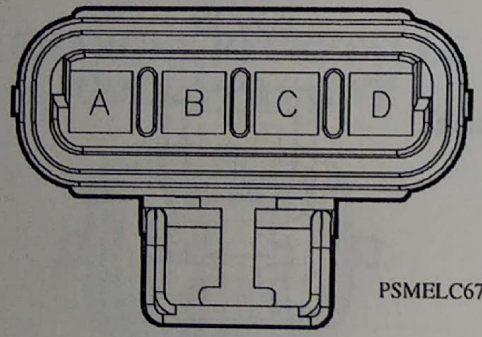
PSMELC66039AA

BLACK
12110293

COOLANT LEVEL SENSOR – 12110293				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK / WHT	450J	.35	GROUND
B	ORN	7F	.35	RUN 1/WAKE–UP
C	LT GRN	1478B	.35	COOLANT LEVEL OUT

Location: Underhood, Below Coolant Expansion Tank

COOLANT PUMP BUFFER



PSMELC67176AA

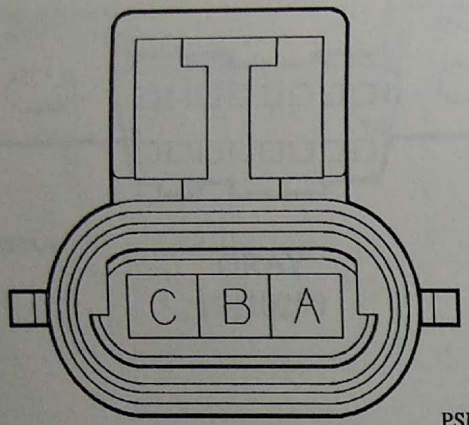
DARK GRAY
12129565

COOLANT PUMP BUFFER – 12129565				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	442B	1.0	B+
B	PNK	2014C	.35	COOLANT PUMP COMMAND IN
C	ORN	7J	.35	RUN 1
D	BLK/WHT	450E	1.0	GROUND

Location: Left Front, Attached to Midrail

CamScanner

COOLANT PUMP TEMPERATURE SENSOR



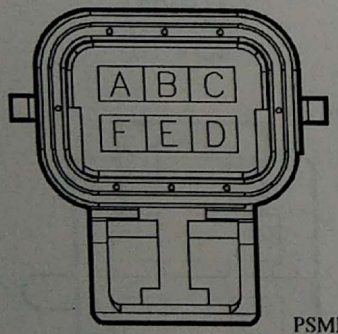
PSMELC66039AA

DARK GRAY
12129565

COOLANT PUMP TEMPERATURE SENSOR – 12129565				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK/WHT	552H	.35	GROUND
B	YEL	410	.35	SENSOR HI

Location: Underhood, At Base of Coolant Pump

COOLANT RECOVERY CHECK VALVE



PSMELC67215AA

BLACK
12052848

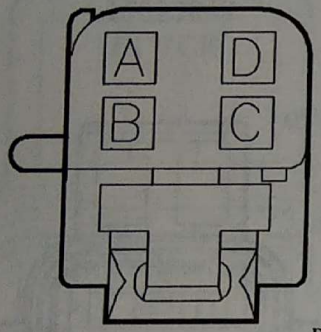
COOLANT RECOVERY CHECK VALVE – 12052848				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	7B	.35	RUN I / WAKE-UP
B	GRA/BLK	1596	.35	VALVE COMMAND IN
C	BLK	452E	.35	GROUND
D	LT BLU / BLK	605E	.35	+5V REF IN
E	PPL	2028	.35	VALVE POSITION OUT
F				

Location: Right Front Attached to Midrail

CamScanner

HARNESS CONNECTOR FACES

CRUISE CONTROL SWITCH



PSMELC67264AA

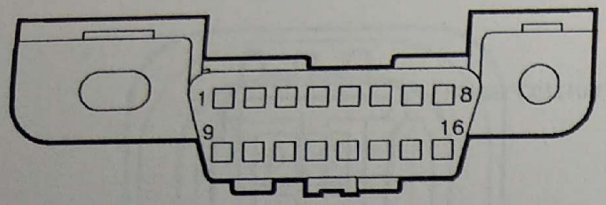
BLACK
12064760

CRUISE CONTROL SWITCH – 12064760				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	41P	.35	RUN 1
B	DK BLU	84	.35	SET/COAST OUT
C	GRA/BLK	87	.35	RESUME/ACCEL OUT
D	GRA	397	.35	ON/OFF OUT

Location: Passenger Compartment, Attached to Steering Column

CamScanner

DATA LINK CONNECTOR (DLC)



PSMELC67259AA

GRAY
12110250

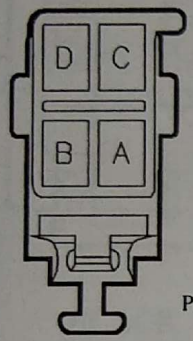
DATA LINK CONNECTOR – 12110250				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1				
2	PPL	1807C	.35	CLASS 2 DATA
3				
4	BLK	450N	.35	GROUND
5	BLK	450T	.35	GROUND
6				
7				
8				
9	TAN	800L	.35	SERIAL DATA
10				
11				
12				
13				
14				
15				
16	ORN	1640	.35	B+

Location: Passenger Compartment, Under Lower Left of I/P

CamScanner

HARNESS CONNECTOR FACES

DEFOGGER AND BATTERY PACK FAN INLINE – FEMALE CONNECTOR



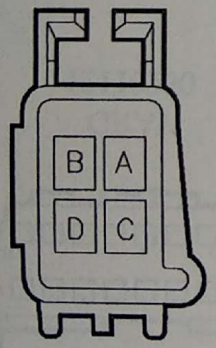
PSMELC67252AA

BLACK
12129136

DEFOGGER AND BATTERY PACK FAN INLINE – 12129136				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1242A	1.0	PRIMARY DEFOG B+
B	RED	1342A	1.0	SECONDARY DEFOG B+
C	RED	1142B	1.0	BATTERY PACK FAN MOTOR B+
D				

Location: Passenger Compartment, Right Side of I/P Above Junction Block

DEFOGGER AND BATTERY PACK FAN INLINE – MALE CONNECTOR



PSMELC67210AA

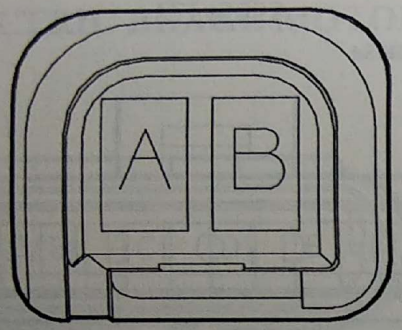
BLACK
12129135

DEFOGGER AND BATTERY PACK FAN INLINE – 12129135				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1242B	2.0	PRIMARY DEFOG B+
B	RED	1342B	3.0	SECONDARY DEFOG B+
C	RED	1142C	3.0	BATTERY PACK FAN MOTOR B+
D				

Location: Passenger Compartment, Right Side of I/P Above Junction Block

CamScanner

DISCHARGE TEMPERATURE SENSOR



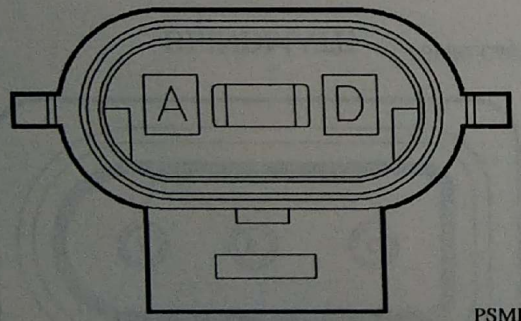
PSMELC67240AA

RED
12059252

DISCHARGE TEMPERATURE SENSOR – 12059252				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	GRA	552E	.35	GROUND
B	DK GRN	734	.35	DISCHARGE TEMP SENSOR OUR

Location: Passenger Compartment, Inside HVAC Module

DRIVER DOOR JAMB SWITCH



PSMELC67199AA

BLACK
12110196

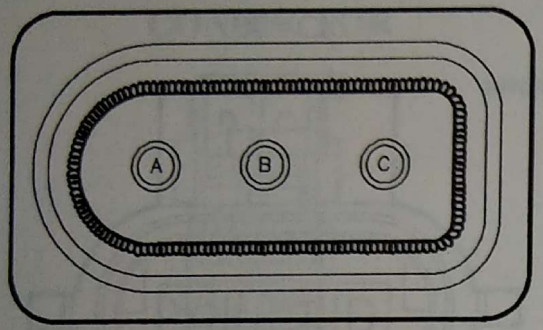
DRIVER DOOR JAMB SWITCH – 12110196				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	GRA / BLK	1495B	.35	SWITCH HI
D	BLK	450L	.35	GROUND

Location: Driver Door, Part of Latch Assembly

CamScanner

HARNESS CONNECTOR FACES

DRIVE MOTOR

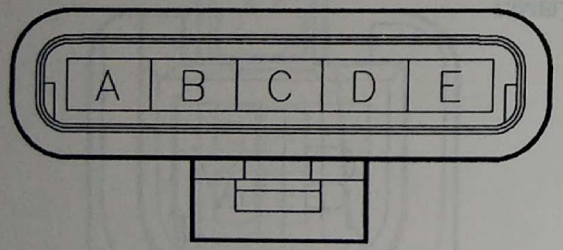


BLINDMATE PSMELC68242AA

DRIVE MOTOR BLINDMATE				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				DRIVE MOTOR PHASE A
B				DRIVE MOTOR PHASE B
C				DRIVE MOTOR PHASE C

Location: Underhood Between Power Electronics Bay and Drive Motor

DRIVE MOTOR SPEED / DIRECTION SENSOR



PSMELC67768AA

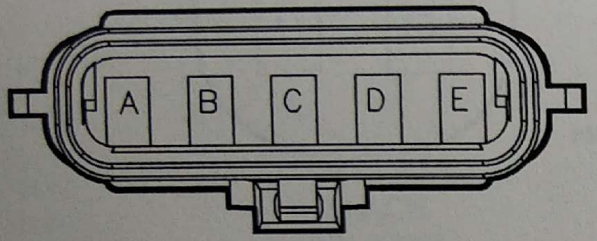
12145555

DRIVE MOTOR SPEED / DIRECTION SENSOR – 12145555				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A	BLK	552CA	.50	GROUND
B	YEL/BLK	1558CA	.50	CHANNEL B
C	BARE	514CM	.50	SPEED / DIRECTION SENSOR SHIELD
D	DK BLU	1557CA	.50	CHANNEL A
E	RED	1673CA	.50	SPEED / DIRECTION SENSOR POWER

Location: Underhood Right Side of Drive Motor

CamScanner

ELECTRIC BRAKE MOTOR



GRAY
12176429

PSMELC67568AA

ELECTRIC BRAKE MOTOR – LEFT REAR – 12176429				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	2005	.80	LR APPLY MOTOR HI
B	WHT	2001	.80	LR PARK MOTOR HI
C	VENT TUBE			
D	TAN	2003	.80	LR PARK MOTOR LO
E	YEL	2007	.80	LR APPLY MOTOR LO

Location: Under Left Rear Of Vehicle – On Brake Backing Plate

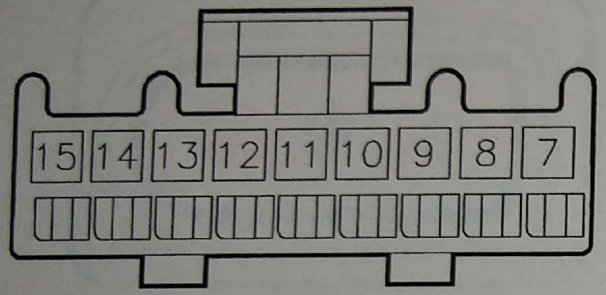
ELECTRIC BRAKE MOTOR – RIGHT REAR – 12176429				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	2008	.80	RR APPLY MOTOR HI
B	RED	1988	.80	RR PARK MOTOR HI
C	VENT TUBE			
D	ORN	2004	.80	RR PARK MOTOR LO
E	DK GRN	2006	.80	RR APPLY MOTOR LO

Location: Under Right Rear of Vehicle – At Brake Backing Plate

CamScanner

HARNESS CONNECTOR FACES

EXTERNAL KEYPAD



PSMELC67212AA

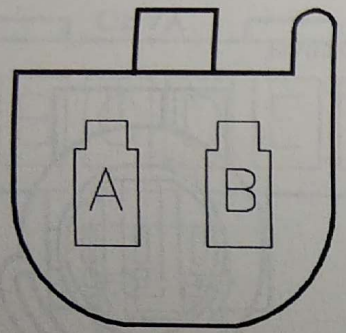
BLACK
12064980

EXTERNAL KEYPAD – 12064980				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
7	LT BLU / BLK	1166B	.35	KEYPAD 1/2 OUT
8	GRA / BLK	1167B	.35	KEYPAD 3/4 OUT
9	LT GRN / BLK	1168B	.35	KEYPAD 5/6 OUT
10	ORN / BLK	1169B	.35	KEYPAD 7/8 OUT
11	PNK / BLK	1170B	.35	KEYPAD 9/0 OUT
12	YEL / BLK	373B	.35	KEYPAD +5V REF
13	RED / BLK	1165B	.35	KEYPAD BACKLIGHT
14				
15	BLK	150F	.35	GROUND

Location: Left Side of Vehicle Behind External Keypad in "B" Pillar

CamScanner

FOUR BAR LAMP



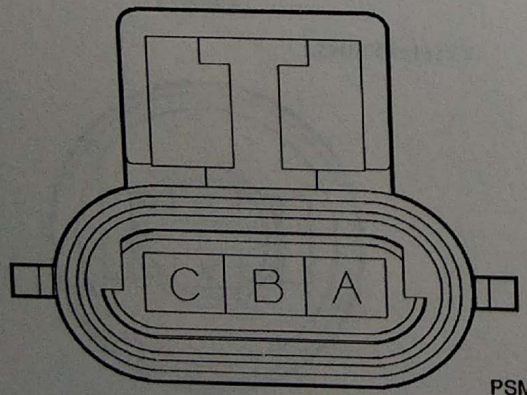
PSMELC67190AA

BLACK
12047662

FOUR BAR LAMP – 12047662				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	156B	.35	LAMP LO
B	ORN	1732G	.35	LAMP HI

Location: Trunk Compartment, Center of Four Bar

FRONT ELECTROMECHANICAL BRAKE (EMB)



PSMELC66039AA

BLACK
12110293

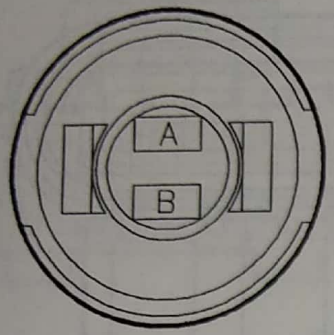
FRONT ELECTROMECHANICAL BRAKE (EMB) – 12110293				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN	1286	.50	FRONT EMB CONTROL
B				
C	RED	1633C	.50	EMB B+

Location: Underhood – Bottom of Brake Modulator

CamScanner

HARNESS CONNECTOR FACES

FRONT MARKER LAMP



PSMELC67173AA

GRAY
12110053

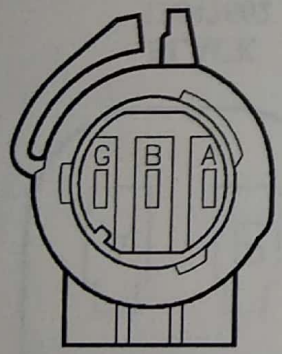
LEFT FRONT MARKER LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	PPL	709C	.35	MARKER LAMP HI
B	BLK / WHT	450G	.35	GROUND

Location: Exterior, Lower Front Fascia

RIGHT FRONT MARKER LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN / WHT	309C	.35	MARKER LAMP HI
B	BLK / WHT	350G	.35	GROUND

Location: Exterior, Lower Front Fascia

FRONT PARK/TURN LAMP



PSMELC67175AA

GRAY
12160395

LEFT FRONT PARK/TURN LAMP – 12160395				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	14	.50	TURN LAMP HI
B	PPL	709B	.50	PARK LAMP HI
G	BLK	450C	.50	GROUND

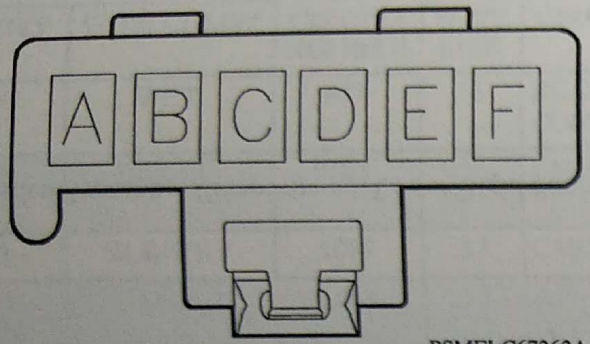
Location: Passenger Compartment, Attached to Steering Column

RIGHT FRONT PARK/TURN LAMP – 12160395				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK BLU	15	.50	TURN LAMP HI
B	BRN / WHT	309B	.50	PARK LAMP HI
G	BLK / WHT	350C	.50	GROUND

Location: Passenger Compartment, Attached to Steering Column

CamScanner

HEADLAMP SWITCH



PSMELC67262AA

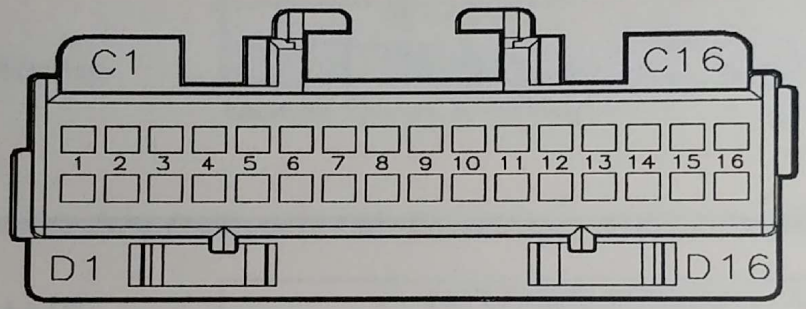
BLACK
12084699

HEADLAMP SWITCH – 12084699				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	640C	.35	FLASH TO PASS SWITCH B+ IN
B	PPL	524B	.35	FLASH TO PASS SWITCH OUT
C	YEL	525B	.35	LOW BEAM OUT
D	RED	342B	1.0	PARK/HEADLAMP SWITCH B+ IN
E	ORN	640B	.35	HEADLAMP SWITCH B+ IN
F	LT BLU	74	.35	PARK/HEADLAMP SWITCH OUT

Location: Passenger Compartment Attached to Steering Column

CamScanner

HEAT PUMP VENTILATION SYSTEM/THERMAL CONTROL MODULE (HTCM)



BLACK
12045575

Location: Passenger Compartment, Lower Right Side of I/P

PSMELC67247AA

CamScanner

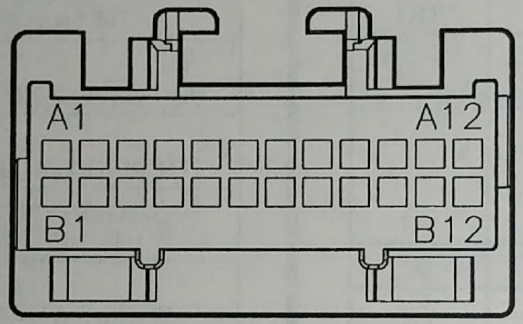
HEAT PUMP VENTILATION SYSTEM/THERMAL CONTROL MODULE – 12045575

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	WHT	637	.35	HEATED W/S COMMAND
C2	DK BLU	1081	.35	CMC/47V STATUS BIT 0
C3	BLK/WHT	1085	.35	CMC SPEED OUT
C4	ORN	1063	.35	APM 12V STATUS BIT 1
C5	YEL	1082	.35	CMC/47V STATUS BIT 1
C6				
C7	PPL	1083	.35	CMC/47V STATUS BIT 2
C8	GRA/BLK	754	.35	BLOWER MOTOR COMMAND OUT
C9	PNK/BLK	1217	.35	CMC DC CURRENT IN
C10	PPL	1645	.35	BRAKE LOAD SHED IN
C11	RED	2014B	.35	COOLANT PUMP COMMAND OUT
C12				
C13	DK GRN	335	.35	COOLING FAN COMMAND OUT
C14	ORN	840R	.35	REVERSING VALVE B+
C15	BLK	452C	.35	OUTSIDE AIR VALVE GROUND
C16	WHT	2016	.35	REVERSING VALVE HI OUT

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1				
D2	RED	1262	.35	APM 12V STATUS BIT 0
D3	DK GRN	1614	.35	OUTSIDE AIR VALVE COMMAND OUT
D4	DK GRN	1264	.35	APM 12V STATUS BIT 2
D5	WHT	193C	.35	REAR DEFOGGER COMMAND OUT
D6	TAN	800H	.35	SERIAL DATA
D7				
D8				
D9	GRA/BLK	1596	.35	COOLANT RECOVERY CHECK VALVE COMMAND OUT
D10	BRN/WHT	1218	.35	MODE DOOR COMMAND OUT
D11				
D12				
D13				
D14	BLK	452B	.35	MODE DOOR GROUND
D15	WHT	2027B	.35	WAKE–UP IN
D16	BLK / WHT	350H	.35	HTCM GROUND

CamScanner

HEAT PUMP VENTILATION SYSTEM/THERMAL CONTROL MODULE (HTCM)



PSMELC67250AA

BLACK
12047946

Location: Passenger Compartment, Lower Right Side of I/P

CamScanner

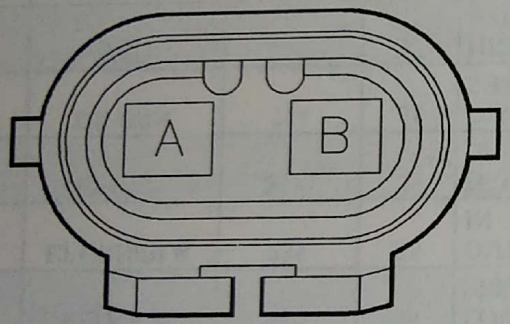
HEAT PUMP VENTILATION SYSTEM THERMAL CONTROL MODULE – 12047946				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1				
A2				
A3	PPL	1838	.35	OUTSIDE AIR VALVE IN
A4	PPL	2028	.35	3–WAY COOLANT VALVE IN
A5	BLK	212	.35	CHARGER RECEP-TACLE COOLANT VALVE IN
A6	RED/BLK	380	.35	LOW SIDE REFRIG PRESSURE IN
A7	LT GRN/BLK	735	.35	OUTSIDE AIR TEMP IN
A8	LT GRN	2032	.35	DRIVE MOTOR COOLANT TEMP IN
A9	DK GRN	734	.35	DISCHARGE TEMP SENSOR IN
A10	YEL	1644	.35	HIGH SIDE REFRIG PRESSURE IN
A11	RED	708	.35	MODE VALVE IN
A12	YEL	410	.35	COOLANT PUMP TEMP IN

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
B1	GRA	605A	.35	+5V REF SIGNAL
B2	ORN	840L	.35	HTCM B+
B3				
B4				
B5				
B6	BRN	41N	.35	HTCM RUN 1
B7				
B8	LT GRN	1478C	.35	COOLANT LEVEL IN
B9	BLK/WHT	1704	.35	CHARGER RECEP-TACLE COOLANT VALVE GROUND
B10	TAN	134	.35	CHARGER RECEP-TACLE COOLANT VALVE COMMAND
B11	BLK	452E	.35	COOLANT RECOV-ERY CHECK VALVE GROUND
B12	DK BLU	732	.35	REFRIG TEMP IN

CamScanner

HARNESS CONNECTOR FACES

HIGH BEAM HEADLAMP



BLACK
12059183

PSMELC67239AA

LEFT HIGH BEAM HEADLAMP – 12059183				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	142A	1.0	HIGH BEAM HEADLAMP B+
B	WHT	1192C	.50	HIGH BEAM HEADLAMP LO

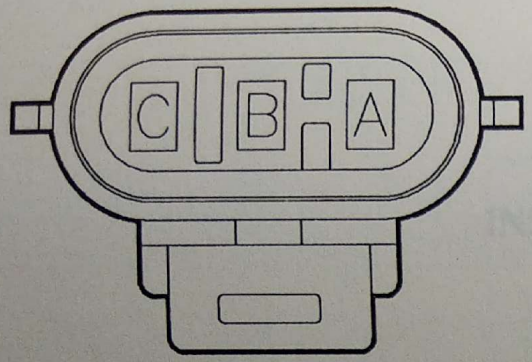
Location: Underhood, Below Closeout Panel

RIGHT HIGH BEAM HEADLAMP – 12059183				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1542	1.0	HIGH BEAM HEADLAMP B+
B	LT GRN	1993B	.50	HIGH BEAM HEADLAMP LO

Location: Underhood, Below Closeout Panel

CamScanner

HIGH NOTE HORN



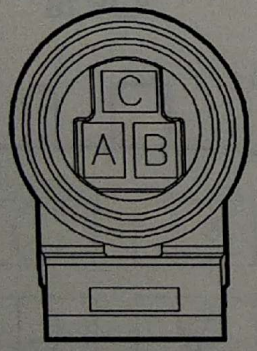
PSMELC67234AA

BLACK
12059595

HIGH NOTE HORN – 12059595				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	40	.35	B+
B	PPL	2025B	.35	HORN COMMAND IN
C	BLK	350A	.35	GROUND

Location: Right Side, Above Wheel House Panel Liner

HIGH PRESSURE SENSOR



PSMELC67231AA

BLACK
12110192

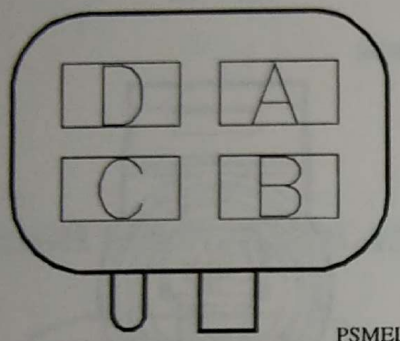
HIGH PRESSURE SENSOR – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	552B	.35	GROUND
B	LT BLU / BLK	605F	.35	+5V REF
C	RED / BLK	380	.35	HIGH SIDE PRESSURE OUT

Location: Underhood, Left Side Attached to Refrigerant Line

CamScanner

HARNESS CONNECTOR FACES

INSIDE REARVIEW MIRROR



PSMELC67229AA

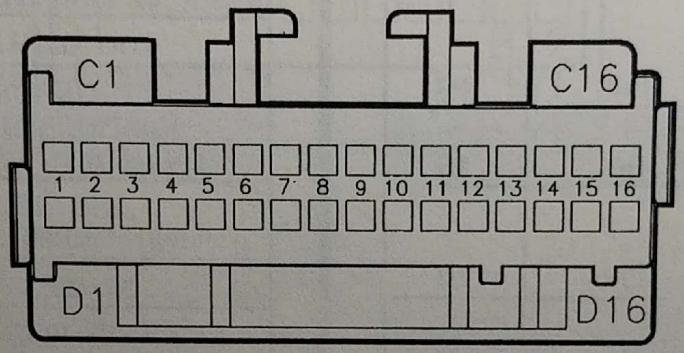
BLACK
12047785

INSIDE REARVIEW MIRROR – 12047785				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	156C	.35	LAMPS LO
B	BLK	350M	.35	LAMPS GROUND
C	ORN	1732F	.35	LAMPS HI
D				

Location: Passenger Compartment, Behind Rearview Mirror

CamScanner

INSTRUMENT PANEL CLUSTER (IPC)



PSMELC67184AA

LIGHT BLUE

12110207

Location: Passenger Compartment, Center of I/P

CamScanner

HARNESS CONNECTOR FACES

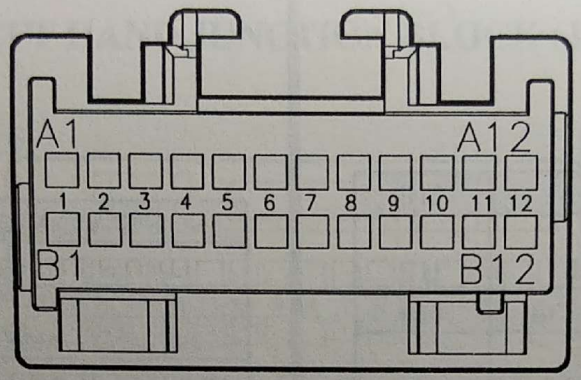
INSTRUMENT PANEL CLUSTER – 12110207

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	BRN	41B	.35	RUN 1
C2				
C3	PNK	2026C	.35	LOW HORN OUT
C4	BRN / WHT	301C	.35	PARKLAMPS ON IN
C5	LT GRN	80C	.35	VEHICLE IN RUN/ACC IN
C6	YEL / BLK	1334C	.35	LR TURN IN
C7	LT BLU	1059	.35	PWR STRG HAND WHEEL SENSOR IN
C8	DK GRN/WHT	1335C	.35	RR TURN IN
C9	WHT	1765	.35	STEERING PUMP SPEED OUT
C10	ORN/BLK	556	.35	PWR STRG HAND WHEEL SENSOR GROUND
C11	PPL	2025C	.35	HI HORN OUT
C12	BRN / WHT	230E	.35	DIM LEVEL IN
C13				
C14	BLK / WHT	450S	.35	GROUND
C15	GRA	1056	.35	PWR STRG HAND WHEEL SENSOR +5V REF
C16	DK BLU	1495F	.35	DOOR AJAR IN

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1	DK GRN	389	.35	VSS IN
D2	BRN	358B	.35	AIR BAG IND IN
D3	PNK	2030B	.35	TEMP INDICATOR OUT
D4	GRA	2029	.35	WAIT INDICATOR OUT
D5	BRN/WHT	419B	.35	SERVICE NOW INDICATOR OUT
D6	YEL	234C	.35	SEAT BELT INDICATOR OUT
D7	RED	2018B	.35	REDUCED PERFORMANCE INDICATOR OUT
D8	WHT	2019	.35	BATTERY DAMAGE INDICATOR OUT
D9	RED	1084	.35	CHECK TIRE PRESSURE INDICATOR OUT
D10	BLK/WHT	238B	.35	SEAT BELT INDICATOR IN
D11				
D12				
D13	TAN	800C	.35	SERIAL DATA
D14	WHT	1192	.35	HIGH BEAMS ON IN
D15				
D16	ORN	640E	.35	B+

CamScanner

LEFT HAND JUNCTION BLOCK (LHJB) (J1)



PSMELC67180AA

PINK
12110244

Location: Passenger Compartment Left, Under Left Side of I/P

CamScanner

HARNESS CONNECTOR FACES

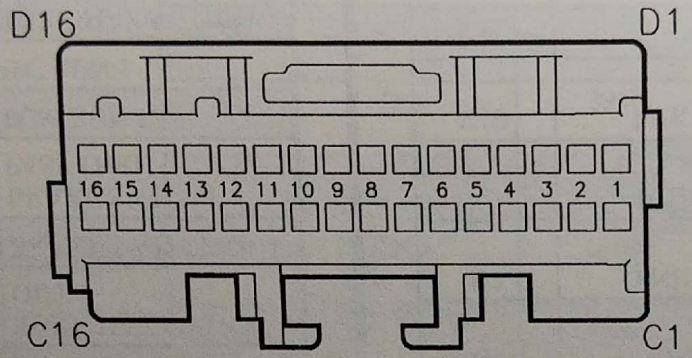
LEFT HAND JUNCTION BLOCK – J1 – 12110244

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	DK BLU	1495F	.35	IPC DOOR AJAR
A2	WHT	2027G	.35	CHARGE RECEPTACLE WAKE–UP
A3	ORN	7J	.35	CLNT PUMP BUFFER RUN 1 WAKE–UP
A4	ORN	7F	.35	CLNT LEVEL SENSOR RUN 1/WAKE–UP
A5	ORN	640H	.35	TURN SIGNAL SWITCH
A6	ORN	640B	.35	HEADLAMP SWITCH B+
A7	ORN	640C	.35	RR LICENSE LAMP HI
A8				
A9	PPL	524B	.35	HDLP SW HI BEAM IN
A10	YEL	525B	.35	HDLP SW LO BEAM IN
A11	DK GRN/WHT	1335C	.35	IPC RR TURN OUT
A12	BRN/WHT	301C	.35	IPC PARKLAMPS ON

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
B1				
B2				
B3	BLK	407E	.35	RF BRAKE PRESSURE SENSOR GROUND
B4	BLK	407C	.35	LF BRAKE PRESSURE SENSOR GROUND
B5	BLK	407B	.35	MC1 PRESSURE SENSOR GROUND
B6	GRA	416F	.35	MC2 PRESSURE SENSOR +5V
B7	GRA	416E	.35	RF PRESSURE SENSOR +5V
B8	GRA	416B	.35	MC1 PRESSURE SENSOR +5V
B9	GRA	416H	.35	LF PRESSURE SENSOR +5V
B10	BLK/WHT	238B	.35	IPC LH SEAT BELT
B11	TAN	1885B	.35	SERVICE SOON TT PASS THRU
B12	LT GRN	2030B	.35	IPC TEMP TT

CamScanner

LEFT HAND JUNCTION BLOCK (J2)



PSMELC67251AA

PINK

12110245

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

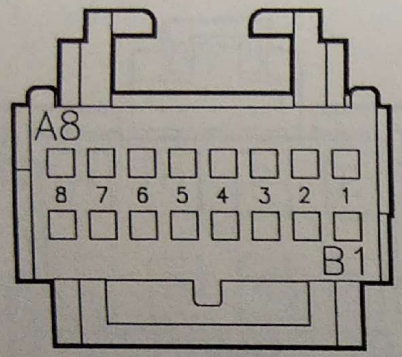
HARNESS CONNECTOR FACES

LEFT HAND JUNCTION BLOCK – J2 – 12110245				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	YEL/BLK	1334C	.35	IPC LR TURN OUT
C2	LT BLU	14	.50	LF TURN LAMP HI
C3	PNK	228C	1.0	WASHER PUMP HI
C4	WHT	17	1.0	BRAKE SWITCH IN
C5	BRN/WHT	230E	.35	IPC DIM LEVEL
C6	ORN	2740	.35	CHARGER RECEPTACLE B+
C7	LT BLU	74	1.0	HEADLAMP SWITCH OUT
C8	LT BLU/WHT	1414	.35	TURN/HAZ SWITCH OUT
C9	DK BLU/WHT	1415	.35	TURN/HAZ SWITCH OUT
C10	BRN	86B	.80	BRAKE SWITCH OUT
C11	BRN	86C	.35	BRAKE SWITCH PASS THRU
C12	BRN	41C	.35	PCM RUN 1
C13	BRN	41B	.35	IPC RUN 1
C14	BRN	41G	.35	TURN/HAZ SWITCH RUN 1
C15	BRN	41P	.35	CRUISE SWITCH RUN 1
C16	BRN	41R	.80	BRAKE SWITCH RUN 1

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1	BRN/WHT	419B	.35	IPC SERVICE NOW INDICATOR
D2	RED	1084	.35	IPC CHECK TIRE PRESSURE INDICATOR
D3	WHT/BLK	2029	.35	IPC WAIT INDICATOR
D4	WHT	2019	.35	IPC BATT DAMAGE INDICATOR
D5				
D6	YEL	234C	.35	IPC SEAT BELT INDICATOR
D7	LT GRN	1478B	.35	COOLANT LEVEL SENSOR
D8	PNK	2014C	.35	COOLANT PUMP BUFFER
D9	PPL	2025C	.35	HIGH NOTE HORN COMMAND IN
D10	PNK	2026C	.35	LOW NOTE HORN COMMAND IN
D11				
D12	PPL	1807E	.35	CHARGER RECEPTACLE CLASS 2 DATA
D13	PNK	213C	.35	CHARGER RECEPTACLE TEMP
D14	RED	2018B	.35	IPC REDUCED PERF INDICATOR
D15	TAN/WHT	816B	.35	PCM BTSI PASS THRU
D16	BLK	28	.35	HORN COMMAND

CamScanner

LEFT HAND JUNCTION BLOCK (LHJB) (J3)



PSMELC67201AA

BLACK
12084944

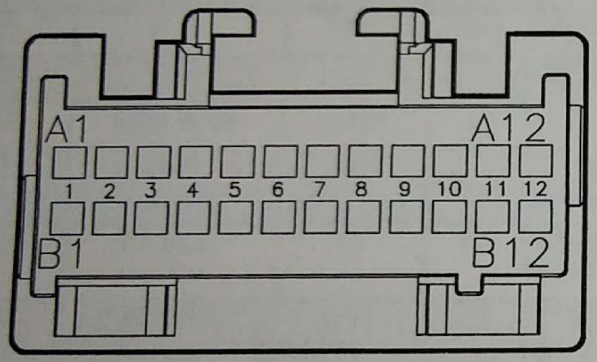
LEFT HAND JUNCTION BLOCK – J3 – 12084944				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	GRA	295E	.35	LH DOOR LOCK MOTOR
A2	RED/BLK	780B	.35	LH DOOR LOCK SWITCH – LOCK
A3	DK BLU	164	.50	LH POWER WINDOW MOTOR
A4	ORN	1040E	.35	LH DOOR LOCK SWITCH – HI
A5	TAN	294E	.35	LH DOOR LOCK MOTOR
A6	BRN	165	.50	LH POWER WINDOW MOTOR
A7	ORN	1040F	.35	POWER WINDOW SWITCH HI
A8	RED/WHT	881C	.35	RH VERT MIRROR MOTOR
B1	ORN/BLK	781B	.35	LH DOOR LOCK SWITCH – UNLOCK
B2	BLK	450B	.35	POWER MIRROR SWITCH GROUND
B3	PPL/WHT	889C	.35	RH HORIZ MIRROR MOTOR
B4	GRA	118C	.35	LF SPEAKER –
B5	BLK	450L	.35	LH DOOR JAMB SWITCH GROUND
B6	TAN	201C	.35	LF SPEAKER +
B7	BRN/WHT	1498C	.35	POWER MIRROR SWITCH HI
B8	GRA/BLK	1495B	.35	LH DOOR JAMB SWITCH HI

Location: Passenger Compartment Under Left Side of I/P

CamScanner

HARNESS CONNECTOR FACES

LEFT HAND JUNCTION BLOCK (LHJB) (J4)



PSMELC67183AA

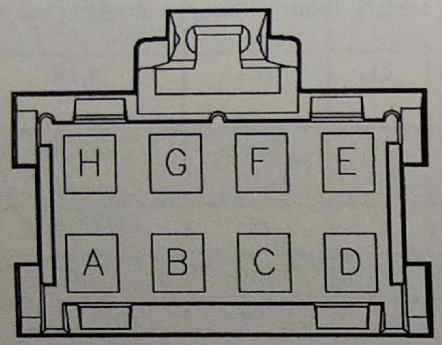
GRAY
12110088

LEFT HAND JUNCTION BLOCK – J4 – 12110088				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	PPL	709C	.35	LF MARKER LAMP HI
A2	PPL	709B	.50	LF PARK LAMP HI
A3	ORN	1940	.35	OIL PUMP B+
A4	ORN	540	.35	PCM B+
A5	WHT	1192E	.35	IPC HIGH BEAM IN
A6	WHT	1192C	.50	LH HIGH BEAM – LO
A7	ORN	640E	.35	IPC B+
A8	RED	1633E	.50	RF SOLENOID B+
A9	RED	1633C	.50	FRONT ELECTRO–MAGNETIC BRAKES B+
A10	PNK	1190C	.50	LH LOW BEAM – LO
A11	BRN	241E	.35	PSCM RUN 2
A12	LT BLU	820E	.35	BTCM BRAKE SWITCH OUT
B1	LT GRN	80C	.35	IPC TO RSA PASS THRU
B2	DK BLU	179	.35	OIL PUMP MODULE IN
B3	TAN	800F	.35	PCM SERIAL DATA
B4	TAN	800C	.35	IPC SERIAL DATA
B5				
B6	BRN	358B	.35	IPC AIR BAG TT
B7				
B8				
B9				
B10				
B11				
B12				

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

LEFT HAND JUNCTION BLOCK (LHJB) (J5)



PSMELC67248AA

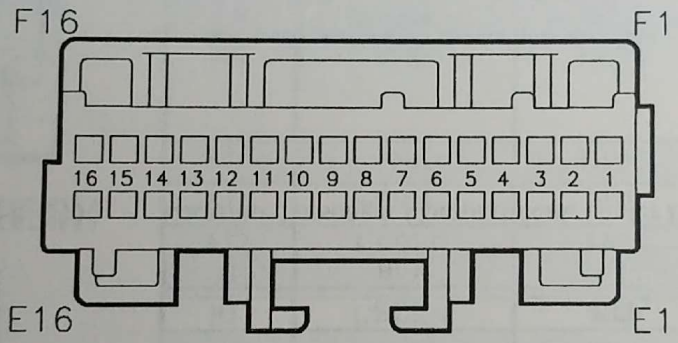
GRAY
12110626

LEFT HAND JUNCTION BLOCK – J5 – 12110626				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	542	5.0	FRONT BRAKE FUSE B+
B	RED	642	5.0	REAR BRAKE FUSE B+
C	RED	742	1.0	TURN/MODULES FUSE B+
D	RED	442A	1.0	LH PWR WINDOW/MISC FUSE B+
E	RED	1633B	3.0	BTCM B+
F	RED	2033	3.0	BTCM B+
G	BLK	450F	3.0	BTCM GROUND
H	BLK	450FF	3.0	BTCM GROUND

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

LEFT HAND JUNCTION BLOCK (J6)



PSMELC67249AA

TAN
12110112

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

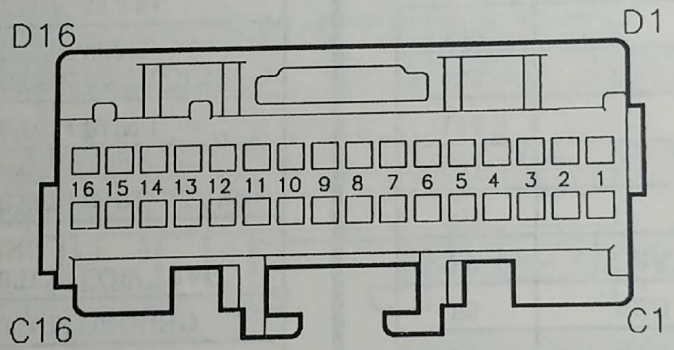
LEFT HAND JUNCTION BLOCK – J6 – 12110112

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
E1	ORN	2540	.35	BTCM B+
E2	BLK	2015	.35	BTCM POWER MOD IN
E3	BLK	151	.35	PARK BRAKE SWITCH
E4	PNK	1632	.35	BTCM POWER MOD IN
E5	TAN/WHT	33	.35	BTCM BRAKE IND
E6	BLK	407A	.35	BTCM GROUND
E7	DK BLU	1660B	.35	BTCM LOW TRAC IND
E8	DK BLU/WHT	1934	.35	BTCM PARK BRAKE IND
E9	BRN	41E	.35	BTCM RUN 1
E10	WHT	852B	.35	BTCM ANTILOCK INDICATOR
E11	ORN	640F	.35	PARK BRAKE SWITCH B+
E12	BRN/WHT	230F	.35	PARK BRAKE SWITCH
E13	BLK	450Y	.35	PARK BRAKE SWITCH GROUND
E14	BLK	450N	.35	DLC GROUND
E15	BLK	450T	.35	DLC GROUND
E16	BLK	1640	.35	DLC B+

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
F1	PPL	1807C	.35	DLC CLASS 2 DATA
F2				
F3	TAN	800L	.35	DLC SERIAL DATA
F4	TAN	800E	.35	BTCM SERIAL DATA
F5	BLK	884B	.35	BTCM LR WSS HI
F6	BRN	882B	.35	BTCM RR WSS HI
F7	WHT	883B	.35	BTCM RR WSS LO
F8	RED	885B	.35	BTCM LR WSS LO
F9	GRA	416A	.35	BTCM +5V REF
F10				
F11				
F12				
F13				
F14				
F15				
F16				

CamScanner

LEFT HAND JUNCTION BLOCK (J8)



PSMELC67251AA

PINK

12110245

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

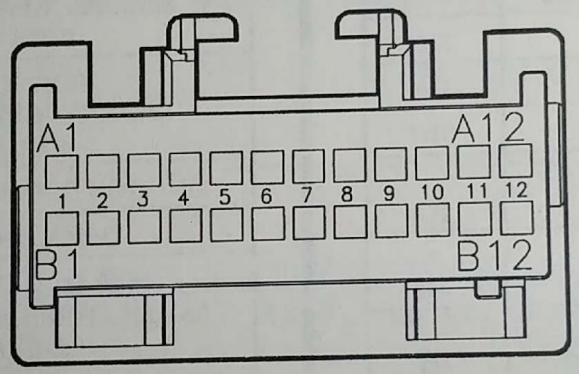
LEFT HAND JUNCTION BLOCK – J8 – 12110245

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	BLK	450M	.35	RSA GROUND
C2	LT GRN	80B	.35	IPC TO RSA PASS THRU
C3	BLK/WHT	238A	.35	LH SEAT BELT PASS THRU
C4	BRN	241A	.35	POWER MODING MODULE RUN 2
C5	TAN	294A	.35	LH DOOR LOCK MOTOR
C6	GRA	295A	.35	LH DOOR LOCK MOTOR
C7	PNK	213A	.35	CHARGE RECEPTACLE PASS THRU TO BPM
C8	BRN	358A	.35	SDM TO IPC
C9	BRN/WHT	419A	.35	SERVICE NOW IND
C10	PPL	524A	.35	TO RHJB HEADLAMP/DRL MODULE
C11	YEL	525A	.35	TO RHJB HEADLAMP/DRL MODULE
C12	ORN	340	.35	RSA B+
C13	ORN	7A	.35	COOLANT LEVEL SENSOR; COOLANT PUMP BUFFER
C14	BRN/WHT	230C	.35	RADIO DIM LEVEL
C15	BRN/WHT	230B	.35	RSA DIM LEVEL
C16	WHT	2027A	.35	BATT REC SW TO CHARGE RECEPT

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1	TAN	1300	.35	RSA LH WINDOW UP
D2	RED	2014A	.35	COOLANT PUMP BUFFER
D3	YEL	234A	.35	IPC SEAT BELT IND
D4	GRA	1136	.35	RSA LH WINDOW DOWN
D5	PPL/WHT	889A	.35	PWR MIRROR SW RH HORIZONTAL
D6	BRN/WHT	1498A	.35	PWR MIRROR SW RH SELECT
D7	DK BLU	1660A	.35	BTCM LOW TRAC INDICATOR
D8	TAN	1885A	.35	PCM SERVICE SOON IND
D9	RED	2018A	.35	IPC REDUCED PERFORMANCE IND
D10	LT GRN	2030A	.35	IPC TEMP IND
D11	PNK	2026A	.35	HORN MOD HI CMD
D12	PPL	2025A	.35	HORN MOD LO CMD
D13	RED/WHT	881A	.35	PWR MIRR SW RH VERT
D14	ORN/BLK	781A	.35	LH DOOR LOCK SWITCH
D15	WHT	852A	.35	BTCM ANTILOCK INDICATOR
D16	PPL	1807A	.35	DLC CLASS 2 DATA

CamScanner

LEFT HAND JUNCTION BLOCK (J9)



PSMELC67180AA

PINK

12110244

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

LEFT HAND JUNCTION BLOCK – J9 – 12110244

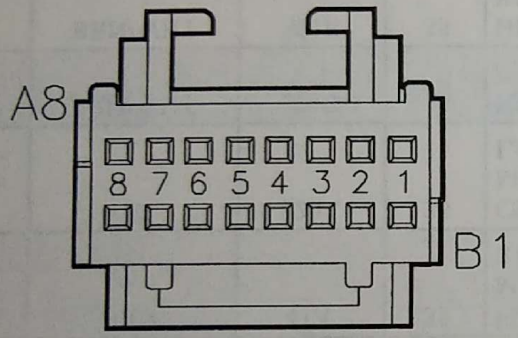
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BRN	9A	.35	REAR LICENSE LAMPS HI REAR SIDE MARKER LAMPS HI REAR TAIL/STOP LAMPS HI
A2	YEL/BLK	1334A	.35	LR TURN LAMP HI
A3	LT GRN	1966A	.35	TO RH TURN/HAZ/DRL MODULE
A4	DK GRN/WHT	1335A	.35	TO RH TURN/HAZ/DRL MODULE
A5	LT BLU	20A	.80	STOP LAMPS HI
A6	BRN	41A	.35	FROM POWER MODING MODULE RUN 1
A7	YEL	820A	.35	CENTER HIGH MOUNTED STOP LAMP HI
A8	BRN/WHT	301B	.35	HEADLAMP SW TO RADIO
A9	BRN/WHT	301E	.35	HEADLAMP SW TO RSA
A10	RED	228A	.35	WASHER PUMP HI
A11	ORN	240	.35	RSA B+
A12	BRN/WHT	309A	.35	RF PARK LAMPS HI

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
B1	TAN	800N	.35	RSA SERIAL DATA
B2	TAN/WHT	816C	.35	RSA TO PCM
B3	GRA	118B	.35	LF SPEAKER -
B4	TAN	201B	.35	LF SPEAKER +
B5	GRA	728	.35	RSA SECURITY IND
B6	RED/BLK	780A	.35	LH DOOR LOCK SWITCH – LOCK
B7	PPL	1697A	.35	TO RHJB TURN/HAZ/DRL MODULE
B8	LT GRN	1478A	.35	COOLANT LEVEL SENSOR
B9	LT GRN	275A	.35	PRND SWITCH IN
B10	LT GRN	275C	.35	PRND SWITCH TO RSA
B11	LT GRN	1495A	.35	DOOR JAMB SWITCH HI
B12	LT GRN	838A	.35	TO RHJB TURN/HAZ/DRL MODULE

CamScanner

HARNESS CONNECTOR FACES

LEFT HAND JUNCTION BLOCK (LHJB) (J10)



PSMELC67195AA

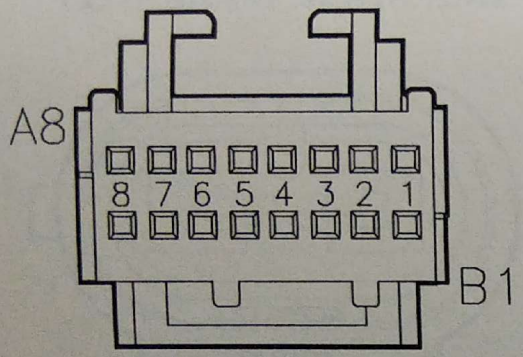
BLUE
12092629

LEFT HAND JUNCTION BLOCK – J10 – 12092629				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BLK	450K	.80	REAR AXLE EMI GROUND
A2	BLK/WHT	238C	.35	LH SEAT BELT SWITCH – HI
A3	BLK	450W	.35	LH SEAT BELT SWITCH GROUND
A4				
A5				
A6				
A7				
A8				
B1				
B2				
B3	WHT	883C	.80	RR WHEEL SPEED SENSOR LO
B4	BRN	882C	.80	RR WHEEL SPEED SENSOR HI
B5	RED	885C	.80	LR WHEEL SPEED SENSOR LO
B6	BLK	884C	.80	LR WHEEL SPEED SENSOR HI
B7				
B8				

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

LEFT HAND JUNCTION BLOCK (LHJB) (J12)



PSMELC67179AA

RED
12092632

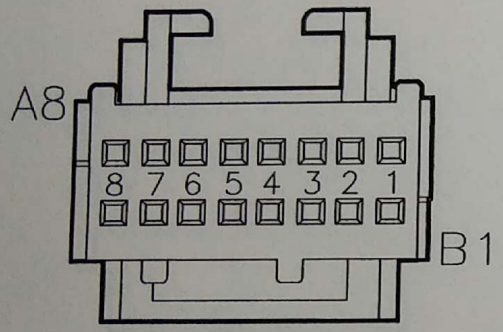
LEFT HAND JUNCTION BLOCK – J12 – 12092632				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BLK	450S	.35	DSCM GROUND
A2	BLK	450C	.50	LF PARK/TURN LAMP GROUND
A3	BLK	450G	.35	LF MARKER LAMP GROUND
A4	BLK	450P	.35	PSCM GROUND
A5	BLK	450R	.35	PCM GROUND
A6	BLK	106	.35	OIL PUMP LO
A7	BLK	450E	1.0	COOLANT PUMP BUFFER GROUND
A8	BLK	450EE	.35	CHARGE PORT GROUND
B1				
B2	BLK	450H	.35	CHARGE PORT GROUND
B3	BLK	450J	.35	COOLANT LEVEL SENSOR GROUND
B4				
B5				
B6				
B7				
B8				

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

HARNESS CONNECTOR FACES

LEFT HAND JUNCTION BLOCK (LHJB) (J13)



PSMELC67194AA

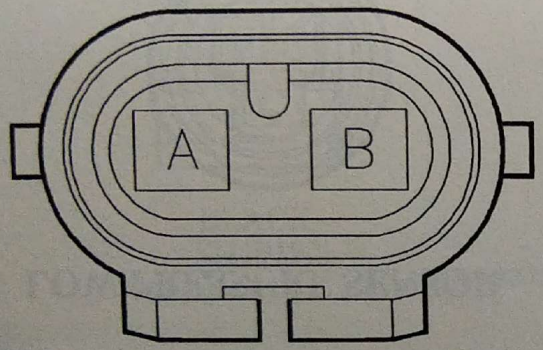
GREEN
12110259

LEFT HAND JUNCTION BLOCK – J13 – 12110259				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BRN	41	.35	LH TT BANK RUN 1
A2				
A3	BRN	27	.35	HAZARD INDICATOR
A4	TAN/WHT	33	.35	BRAKE SYSTEM INDICATOR
A5	WHT/BLK	2029	.35	WAIT INDICATOR
A6	LT BLU	1934	.35	PARKING BRAKE INDICATOR
A7				
A8	GRA	728	.35	SECURITY INDICATOR
B1	ORN	640	.35	LH TT BANK B+
B2				
B3				
B4	WHT	2019	.35	BATTERY LIFE INDICATOR
B5	RED	1084	.35	CHECK TIRE PRESSURE INDICATOR
B6				
B7				
B8	BLK	450	.35	LH TT BANK GROUND

Location: Passenger Compartment, Under Left Side of I/P

CamScanner

LOW BEAM HEADLAMP



PSMELC67236AA

DARK GRAY
12059181

LEFT LOW BEAM HEADLAMP – 12059181				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	342A	1.0	LOW BEAM HEADLAMP B+
B	PNK	1190	.50	LOW BEAM HEADLAMP LO

Location: Underhood, Below Closeout Panel

RIGHT LOW BEAM HEADLAMP – 12059181				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1442A	1.0	LOW BEAM HEADLAMP B+
B	TAN	1191B	.50	LOW BEAM HEADLAMP LO

Location: Underhood, Below Closeout Panel

CamScanner

HARNESS CONNECTOR FACES

LOW NOTE HORN

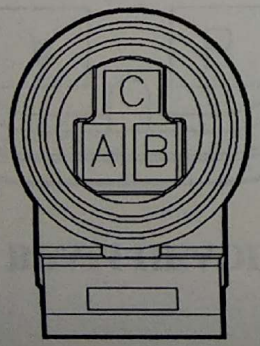
PSMELC67234AA

BLACK
12059595

LOW NOTE HORN – 12059595				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	140	.35	B+
B	PNK	2026B	.35	HORN COMMAND IN
C	BLK / WHT	350B	.35	GROUND

Location: Right Side, Above Wheel House Panel Liner

LOW PRESSURE SENSOR



PSMELC67231AA

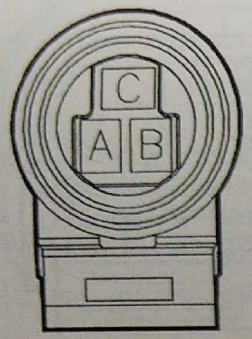
BLACK
12110192

LOW PRESSURE SENSOR – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	552C	.35	GROUND
B	GRA	605G	.35	+5V REF
C	YEL	1644	.35	LOW SIDE PRESSURE OUT

Location: Underhood, Center Attached to Refrigerant Line

CamScanner

MASTER CYLINDER (MC) PRESSURE SENSOR–UPSTREAM



BLACK
12110192

PSMELC67231AA

MASTER CYLINDER PRESSURE SENSOR – MC1 – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	407B	.35	GROUND
B	GRA	416B	.35	+5V REF
C	YEL	2034	.35	MC1 PRESSURE SIGNAL

Location: Underhood – Bottom Of Brake Modulator

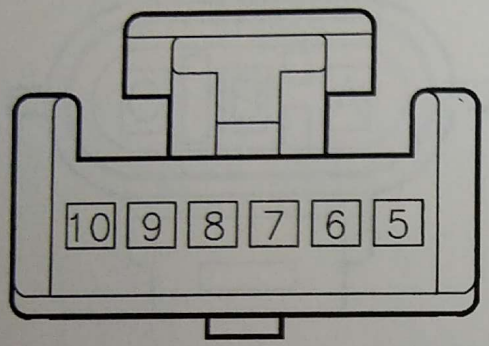
MASTER CYLINDER PRESSURE SENSOR – MC2 – 12110192				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	407F	.35	GROUND
B	GRA	416F	.35	+5V REF
C	GRA	2035	.35	MC2 PRESSURE SIGNAL

Location: Underhood – Bottom Of Brake Modulator

CamScanner

HARNESS CONNECTOR FACES

MODE VALVE ACTUATOR



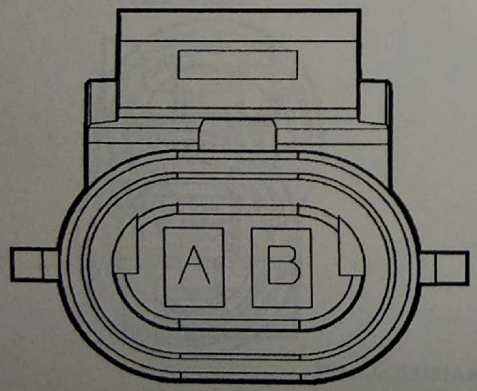
PSMELC68246AA

BLACK
12064993

MODE VALVE ACTUATOR – 12064993				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
5	ORN	7C	.35	RUN 1/WAKE–UP
6	BRN/WHT	1218	.35	VALVE COMMAND IN
7	BLK	452B	.35	GROUND
8				
9	RED	708	.35	VALVE POSITION OUT
10	LT BLU/BLK	605B	.35	+5V REF IN

Location: Passenger Compartment, Under Right Side of I/P

MOTOR WINDING TEMPERATURE SENSOR



GRAY
12052644

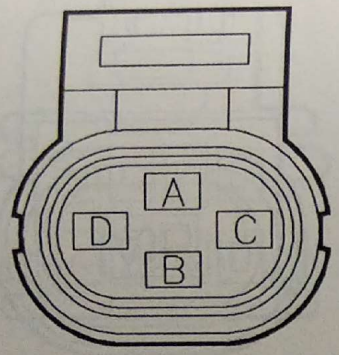
PSMELC66031AA

MOTOR WINDING TEMPERATURE SENSOR – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A	LT GRN	37	.50	SENSOR HI
B	GRA/BLK	1798	.50	GROUND

Location: Underhood, Top Center of Drive Motor

CamScanner

OIL PRESSURE SWITCH



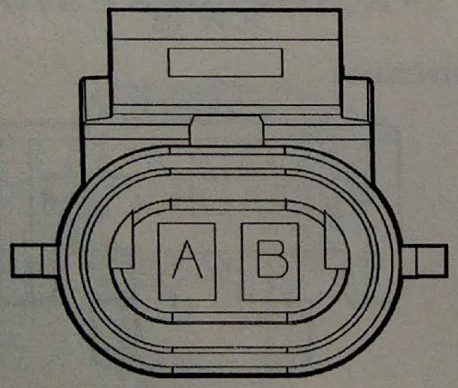
PSMELC67769AA

BROWN
12065402

OIL PRESSURE SWITCH – 12065402				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
C	TAN/WHT	331	.80	SWITCH HI
D	ORN/BLK	1175	.80	GROUND

Location: Underhood, Center of Drive Motor

OIL PUMP



GRAY
12052644

PSMELC66031AA

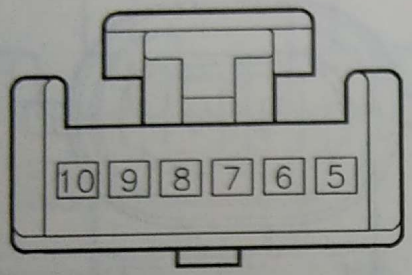
OIL PUMP – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A	ORN	1940	.35	B+
B	BLK	106	.35	PUMP LO

Location: Underhood, Left Side of Drive Motor

CamScanner

HARNESS CONNECTOR FACES

OUTSIDE AIR VALVE ACTUATOR



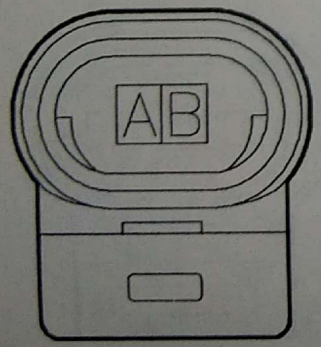
PSMELC68246AA

BLACK
12064993

OUTSIDE AIR VALVE ACTUATOR – 12064993				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
5	ORN	7E	.35	RUN 1/WAKE–UP
6	DK GRN	1614	.35	DOOR COMMAND IN
7	BLK	452C	.35	GROUND
8				
9	PPL	1838	.35	DOOR POSITION OUT
10	GRA	605C	.35	+5V REF IN

Location: Passenger Compartment, Under Right Side of I/P

OUTSIDE TEMPERATURE SENSOR



PSMELC68247AA

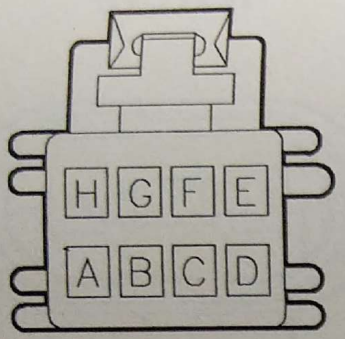
BLACK
12110170

OUTSIDE TEMPERATURE SENSOR – 12110170				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN / BLK	735	.35	SENSOR HI
B	BLK	552F	.35	GROUND

Location: Underbody, Behind Front Fascia

CamScanner

PARK BRAKE SWITCH



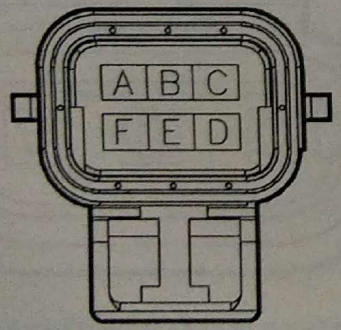
BLUE
12064766

PSMELC67230AA

PARK BRAKE SWITCH – 12064766				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	450Y	.35	GROUND
B			.35	
C	LT BLU	1134	.35	PARK BRAKE SWITCH IDLE OUT
D	ORN	640F	.35	B+
E	BLK/WHT	151	.35	GROUND
F	PNK	2031	.35	PARK BRAKE SWITCH WAKE-UP OUT
G				
H	BRN/WHT	230F	.35	DIMMER IN

Location: I/P Lower Left

PARK REVERSE NEUTRAL DRIVE (PRND) SWITCH #1



PSMELC67215AA

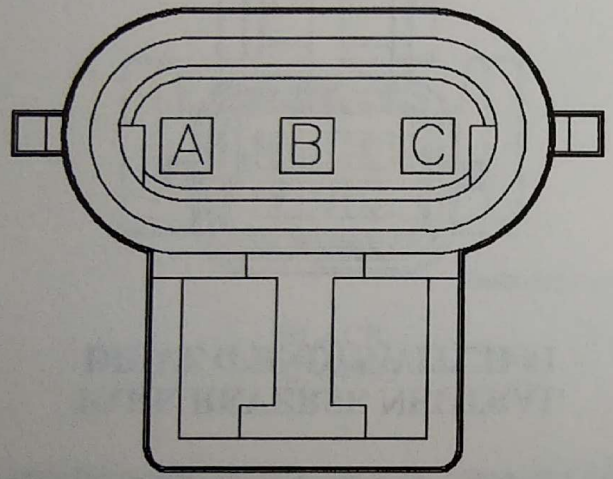
BLACK
12052848

PRND SWITCH #1 – 12052848				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A	BLK/WHT	771BC	.50	CHANNEL A
B	YEL	772BC	.50	CHANNEL B
C	GRA	773BC	.50	CHANNEL C
D	WHT	776BC	.50	PARITY
E	BLK	470BC	.50	GROUND
F				

CamScanner

HARNESS CONNECTOR FACES

PARK REVERSE NEUTRAL DRIVE (PRND) SWITCH #2



BLACK
12110293

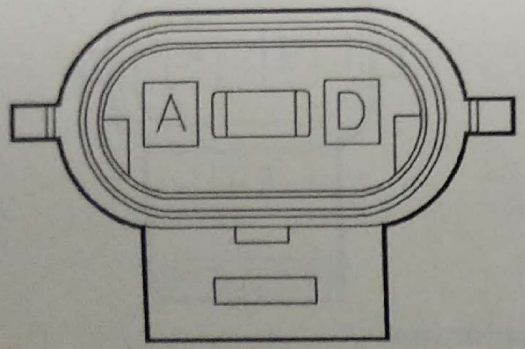
PSMELC67197AA

PRND SWITCH #2 – 12110293				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	2840	.80	B+
B	LT GRN	24A	.50	REVERSE SELECT
C	LT GRN	275E	.35	PARK SELECT

Location: Underhood, Lower Center of Drive Motor

CamScanner

PASSENGER DOOR JAMB SWITCH



PSMELC67199AA

BLACK
12110196

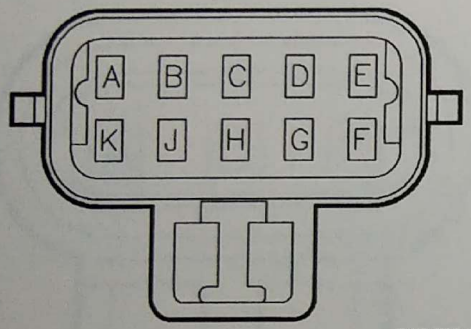
PASSENGER DOOR JAMB SWITCH – 12110196				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	350J	.35	GROUND
D	BLK/WHT	1495C	.35	SWITCH HI

Location: Passenger Door, Part of Latch Assembly

CamScanner

HARNESS CONNECTOR FACES

PEDAL POSITION SENSOR



PSMELC67263AA

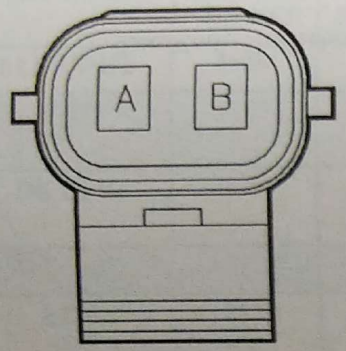
BLACK
12065425

PEDAL POSITION SENSOR – 12065425				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRESIZE	CIRCUIT FUNCTION
A	BRN	1271	.35	GROUND
B	PPL	1272	.35	GROUND
C	LT BLU	1162	.35	PEDAL POSITION #2
D	TAN	1274	.35	+5V REF IN
E	YEL/BLK	1275	.35	+5V REF IN
F	DK BLU	1161	.35	PEDAL POSITION #1
G	WHT/BLK	1164	.35	+5V REF IN
H				
J	GRA	1273	.35	GROUND
K	DK GRN	1163	.35	PEDAL POSITION #3

Location: Top of Accelerator Pedal

CamScanner

POWER DOOR LOCK MOTOR



PSMELC67198AA

BLACK
15300027

LEFT POWER DOOR LOCK MOTOR – 15300027				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	TAN	294E	.35	DOOR UNLOCK
B	GRA	295E	.35	DOOR LOCK

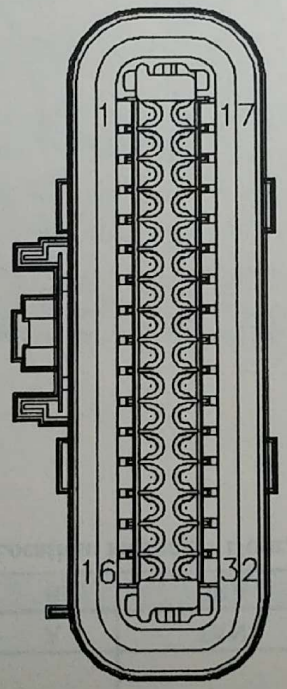
Location: Driver Door, Part of Latch Assembly

RIGHT POWER DOOR LOCK MOTOR – 15300027				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	TAN	294C	.35	DOOR UNLOCK
B	GRA	295C	.35	DOOR LOCK

Location: Passenger Door, Part of Latch Assembly

CamScanner

POWER INVERTER MODULE (PIM) – J1



NATURAL
12129025

Location: Underhood, Center of Power Inverter Module

PSMELC67266AB

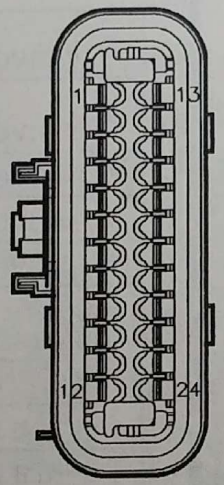
CamScanner

POWER INVERTER MODULE – J1 – 12129025

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	BLK / WHT	450R	.35	PCM GROUND
2	WHT	1765	.35	STEERING PUMP SPEED (PSCM IN)
3	DK BLU	179	.35	OIL PUMP CONTROL OUT
4	DK GRN	389	.35	VSS OUT
5	BRN	1855B	.35	SERVICE SOON INDICATOR OUT
6	TAN/WHT	816B	.35	BTSI CONTROL OUT
7	PNK	2021	.35	REGEN DISABLE IN
8	DK GRN	2023	.35	CHARGE RECEPTACLE IN
9	DK BLU	84	.35	SET/COAST IN
10	GRA	397	.35	CRUISE ON
11	DK BLU	2038	.35	RETARD ACHIEVED OUT
12	LT GRN	1163	.35	ACCEL PEDAL IN
13	PNK	1162	.35	ACCEL PEDAL IN
14	TAN	1161	.35	ACCEL PEDAL IN
15	DK GRN	1275	.35	ACCEL PEDAL +5V REF
16	PPL	1274	.35	ACCEL PEDAL +5V REF
17	BLK	450P	.35	PSCM GROUND
18	PPL	2017	.35	RETARD REQUEST IN
19	BRN	41C	.35	RUN 1
20	ORN	540	.35	B+
21				
22	TAN	800F	.35	SERIAL DATA
23				
24	BRN	86C	.35	BRAKE SWITCH IN
25	GRA/BLK	87	.35	RESUME/ACCEL IN
26	BRN	241E	.35	RUN 2
27				
28	RED	1273	.35	ACCEL PEDAL GROUND
29	BLK	1272	.35	ACCEL PEDAL GROUND
30	WHT	1271	.35	ACCEL PEDAL GROUND
31	YEL	1164	.35	ACCEL PEDAL +5V REF
32				

CamScanner

POWER INVERTER MODULE (J2)



PSMELC67235AA

GRAY
12129225

Location: Underhood, Center of Power Inverter Module

CamScanner

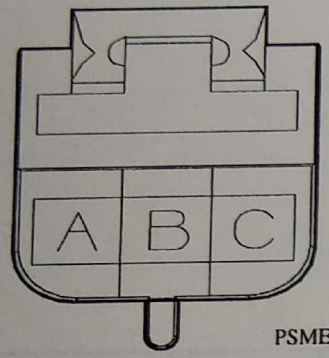
POWER INVERTER MODULE – J2 – 12129225

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1				
2				
3				
4	PNK	1798	.50	MOTOR WINDING TEMP SENSOR GROUND
5	DK GRN	37	.50	MOTOR WINDING TEMP SENSOR HI
6	BLK	470BC	.50	PRND SWITCH GROUND
7	WHT	776BC	.50	PRND PARITY
8	GRA	773BC	.50	PRND CHANNEL C
9	YEL	772BC	.50	PRND CHANNEL B
10	BLK/WHT	771BC	.50	PRND CHANNEL A
11	ORN/BLK	1175	.80	OIL PRESSURE SWITCH GROUND
12	TAN/WHT	331	.80	OIL PRESSURE SWITCH HIGH
13	RED	1673CA	.50	DRIVE MOTOR ENCODER POWER
14	DK BLU/WHT	1557CA	.50	DRIVE MOTOR ENCODER A
15	YEL/BLK	1558CA	.50	DRIVE MOTOR ENCODER B
16	BLK	552CA	.50	DRIVE MOTOR ENCODER GROUND
17	BARE	514CM		DRIVE MOTOR ENCODER SHIELD
18				
19				
20				
21				
22				
23				
24				

CamScanner

HARNESS CONNECTOR FACES

POWER DOOR LOCK SWITCH



PSMELC66033AA

BLACK
12064758

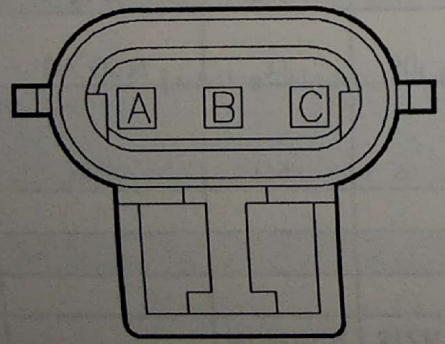
LEFT POWER DOOR LOCK SWITCH – 12064758				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED/BLK	780B	.35	LOCK OUT
B	ORN	1040E	.35	B+
C	ORN/BLK	781B	.35	UNLOCK OUT

Location: Driver Door

RIGHT POWER DOOR LOCK SWITCH – 12064758				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN/BLK	781C	.35	UNLOCK OUT
B	ORN	740	.35	B+
C	RED/BLK	780C	.35	LOCK OUT

Location: Passenger Door

POWER MIRROR MOTOR



PSMELC67241AA

BLACK
12110293

LEFT POWER MIRROR MOTOR – 12110293				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT GRN	89	.35	LH VERTICAL MOTOR
B	YEL	88	.35	DUAL CIRCUIT
C	WHT	81	.35	LH HORIZONTAL MOTOR

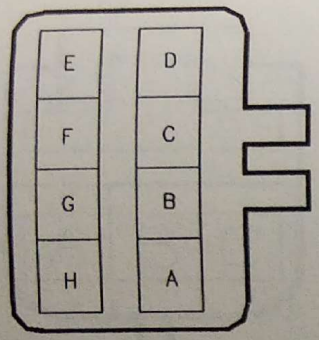
Location: Driver Power Mirror

RIGHT POWER MIRROR MOTOR – 12110293				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	PPL/WHT	889B	.35	RH VERTICAL MOTOR
B	BRN/WHT	1498B	.35	DUAL CIRCUIT
C	RED/WHT	881B	.35	RH HORIZONTAL MOTOR

Location: Driver Power Mirror

CamScanner

POWER MIRROR SWITCH



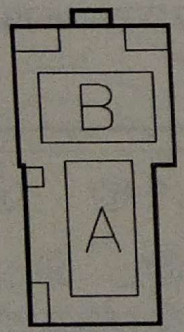
SMELCS1974AA

BLACK
12047886

POWER MIRROR SWITCH – 12047886				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED/WHT	881C	.35	RH HORIZONTAL
B	PPL/WHT	889C	.35	RH VERTICAL
C	BRN/WHT	1498C	.35	RH MIRROR SELECT
D	BLK	450B	.35	GROUND
E	ORN	1040F	.35	B+
F	LT GRN	89	.35	LH VERTICAL
G	WHT	81	.35	LH HORIZONTAL
H	YEL	88	.35	LH MIRROR SELECT

Location: Driver Door

POWER OUTLET



PSMELC67192AA

DARK GRAY
12033934

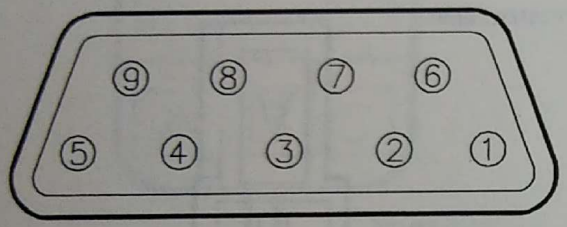
POWER OUTLET – 12033934				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN	1440	.35	B+
B	BLK	150J	.35	GROUND

Location: Passenger Compartment, Right Rear Upper/Inner Quarter Trim Panel

CamScanner

HARNESS CONNECTOR FACES

POWER STEERING CONTROL MODULE (PSCM)



PSMELC68243AA

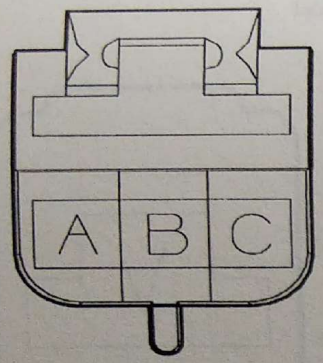
BLINDMATE

POWER STEERING CONTROL MODULE BLINDMATE				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1				POWER STEERING PUMP SPEED INPUT
2				RUN 2
3				
4				PSCM HV INTERLOCK (+)
5				HV–
6				GROUND
7				
8				HV+
9				PSCM HV INTERLOCK RETURN (–)

Location: Underhood Attached to Lower Right of Power Electronics Bay.

CamScanner

POWER STEERING HAND WHEEL SENSOR



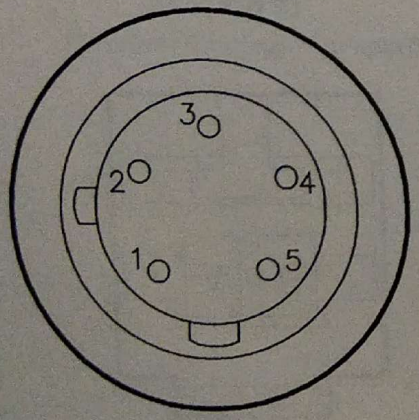
BLACK
12064758

PSMELC66033AA

POWER STEERING HAND WHEEL SENSOR – 12064758				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	GRA	1056	.35	+5 REF
B	LT BLU	1059	.35	HAND WHEEL ROTATION SIGNAL OUT
C	ORN/BLK	556	.35	GROUND

Location: Steering Column

POWER STEERING PUMP MOTOR



YELLOW
MOLEX CONNECTOR

PSMELC66464AC

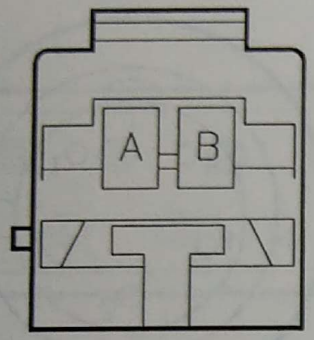
POWER STEERING PUMP MOTOR MOLEX CONNECTOR				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1				MOTOR PHASE A
2				MOTOR PHASE B
3				MOTOR PHASE C
4				HIGH VOLTAGE + INTERLOCK CIRCUIT
5				HIGH VOLTAGE – INTERLOCK CIRCUIT

Location: Front Side of Power Steering Control Module

CamScanner

HARNESS CONNECTOR FACES

POWER WINDOW MOTOR



PSMELC67200AA

NATURAL
12033911

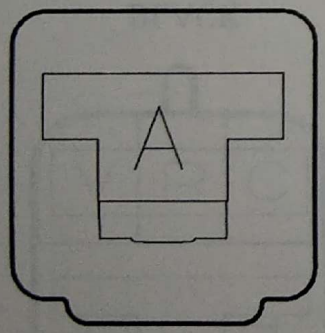
LEFT POWER WINDOW MOTOR – 12033911				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	165	.50	LEFT WINDOW DOWN
B	DK BLU	164	.50	LEFT WINDOW UP

Location: Left Door

RIGHT POWER WINDOW MOTOR – 12033911				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	667	.50	RIGHT WINDOW DOWN
B	DK BLU	666	.50	RIGHT WINDOW UP

Location: Right Door

PRIMARY REAR DEFOGGER



PSMELC67188AB

BLACK
12092133

PRIMARY REAR DEFOGGER – 12092133				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1242B	2.0	PRIMARY REAR DEFOG – HIGH

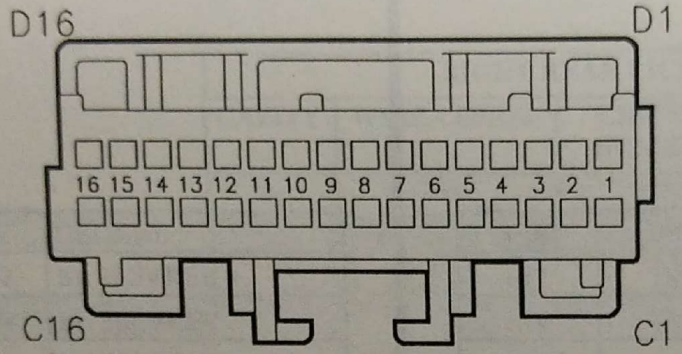
Location: Right Side of Rear Back Glass

PRIMARY REAR DEFOGGER – 12092133				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	292	2.0	PRIMARY REAR DEFOG – LOW

Location: Right Side of Rear Back Glass

CamScanner

RADIO



PSMELC67224AA

BLUE
12110115

Location: Passenger Compartment Center of I/P

CamScanner

HARNESS CONNECTOR FACES

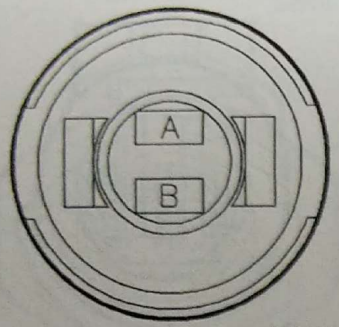
RADIO – 12110115

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
E1				
E2				
E3				
E4				
E5				
E6				
E7				
E8				
E9				
E10				
E11				
E12	BRN	199B	.35	LR SPEAKER +
E13	YEL	116B	.35	LR SPEAKER –
E14	DK GRN	117B	.35	RF SPEAKER –
E15	LT GRN	200B	.35	RF SPEAKER +
E16	BLK	1051	.35	GROUND

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
F1	ORN	2040	.35	B+
F2	PNK	314	.35	RADIO WAKE–UP IN
F3				
F4	BRN/WHT	230C	.35	DIM LEVEL IN
F5	BRN/WHT	301B	.35	PARK LAMP IN
F6				
F7				
F8				
F9				
F10				
F11				
F12	TAN	201B	.35	LF SPEAKER +
F13	GRA	118B	.35	LF SPEAKER –
F14	LT BLU	115B	.35	RR SPEAKER –
F15	DK BLU	46B	.35	RR SPEAKER +
F16				

CamScanner

REAR LICENSE LAMP



PSMELC67173AA

GRAY
12110053

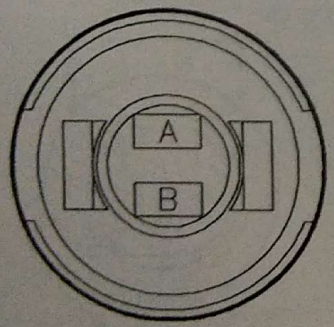
LEFT REAR LICENSE LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK BLU	809E	.35	LICENSE LAMP HI
B	BLK	150C	.35	GROUND

Location: Trunk Compartment, Attached to Decklid

RIGHT REAR LICENSE LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	609E	.35	LICENSE LAMP HI
B	BLK	150E	.35	GROUND

Location: Trunk Compartment, Attached to Decklid

REAR MARKER LAMP



PSMELC67173AA

GRAY
12110053

LEFT REAR MARKER LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK BLU	809C	.35	MARKER LAMP HI
B	BLK	150PP	.35	GROUND

Location: Exterior, Behind Tail/Stop Lamp Housing

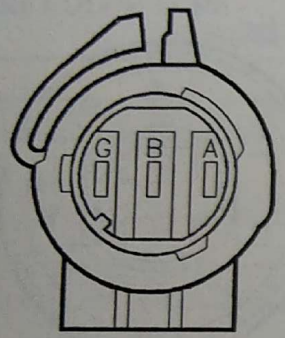
RIGHT REAR MARKER LAMP – 12110053				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	609C	.35	MARKER LAMP HI
B	BLK	150P	.35	GROUND

Location: Exterior, Behind Tail/Stop Lamp Housing

CamScanner

HARNESS CONNECTOR FACES

REAR TAIL/STOP LAMP



PSMELC67175AA

GRAY
12160395

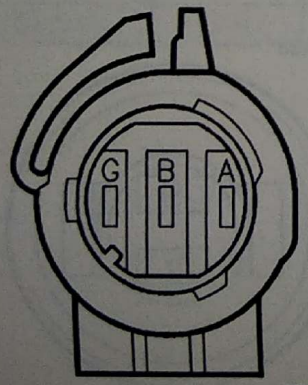
LEFT REAR TAIL/STOP LAMP – 12160395				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	20H	.50	STOP LAMP HI
B	DK BLU	809B	.50	PARK LAMP HI
G	BLK	150SS	.50	GROUND

Location: Exterior, Behind Tail/Stop Lamp Housing

RIGHT REAR TAIL/STOP LAMP – 12160395				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	20G	.50	STOP LAMP HI
B	WHT	609B	.50	PARK LAMP HI
G	BLK	150S	.50	GROUND

Location: Exterior, Behind Tail/Stop Lamp Housing

REAR TURN LAMP



PSMELC67205AA

GRAY
12160393

LEFT REAR TURN LAMP – 12160393				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	YEL/BLK	1334F	.50	TURN LAMP HI
B	BLK	150RR	.50	GROUND

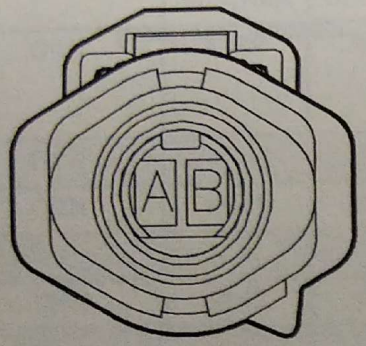
Location: Exterior, Behind Turn/Stop Lamp Housing

RIGHT REAR TURN LAMP – 12160393				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK GRN/WHT	1335F	.50	TURN LAMP HI
B	BLK	150R	.50	GROUND

Location: Exterior, Behind Turn/Stop Lamp Housing

CamScanner

REFRIGERANT TEMPERATURE SENSOR



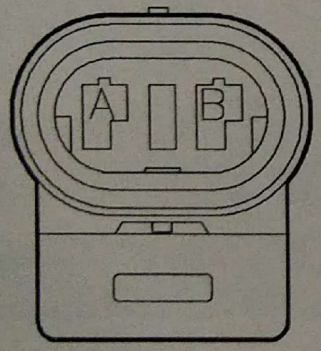
BLACK
12092512

PSMELC67245AA

REFRIGERANT TEMPERATURE SENSOR – 12092512				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK BLU	732	.35	SENSOR HI
B	GRA	552G	.35	GROUND

Location: Underhood, Left Side Attached to Refrigerant Line

REVERSING VALVE



PSMELC67246AA

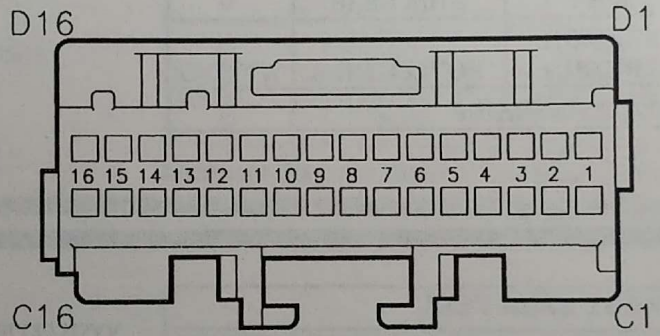
GRAY
12162343

REVERSING VALVE – 12162343				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK / WHT	350R	.35	GROUND
B	WHT	2016	.35	VALVE HI

Location: Underhood, Center of Crossmember

CamScanner

RIGHT HAND JUNCTION BLOCK (J1)



PSMELC67251AA

PINK

12110245

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

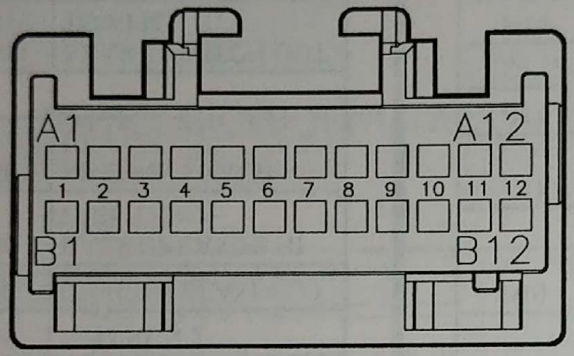
RIGHT HAND JUNCTION BLOCK – J1 – 12110245

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	ORN	840R	.35	TO HTCM – REVERSING VALVE B+
C2	ORN	840L	.35	HTCM B+
C3	ORN	840B	.35	BPM B+
C4				
C5	ORN	2840	.80	PRND ENCODER B+
C6	RED	228B	.35	WASHER PUMP HI PASS THRU
C7	BRN	41S	.35	BPM RUN 1
C8	BRN	41N	.35	HTCM RUN 1
C9				
C10	YEL	1139	.50	SDM RUN 1
C11	BRN	241B	.35	APM RUN 2
C12	LT GRN	1193B	.50	RH HIGH BEAM – LO
C13	LT GRN	24A	.50	BACKUP LAMPS HI PASS THRU
C14	DK BLU	15	.50	RF TURN SIGNAL – HI
C15				
C16	YEL	820C	.35	BRAKE SWITCH OUT TO APM

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1				
D2	PNK	213B	.35	CHARGE PORT TEMP TO BPM
D3				
D4	LT GRN	275E	.35	PRND ENCODER IN
D5	LT GRN	275B	.35	PRND ENCODER TO BPM
D6	PPL	1807B	.35	BPM CLASS 2 DATA
D7	WHT	108B	.35	BATTERY PACK FAN PASS THRU
D8	BLK/WHT	238E	.35	LH SEAT BELT SWITCH TO SDM PASS THRU
D9	PNK	2014B	.35	COOLANT PUMP TO HTCM PASS THRU
D10	LT GRN	1478C	.35	COOLANT LEVEL SENSOR TO HTCM PASS THRU
D11	WHT	193C	.35	HTCM TO TJB PASS THRU
D12				
D13				
D14				
D15	BRN	358E	.35	AIR BAG INDICATOR TO SDM
D14				

CamScanner

RIGHT HAND JUNCTION BLOCK (RHJB) (J2)



PSMELC67180AA

PINK
12110244

Location: Passenger Compartment Under Right Side of I/P

CamScanner

RIGHT HAND JUNCTION BLOCK – J2 – 12110244

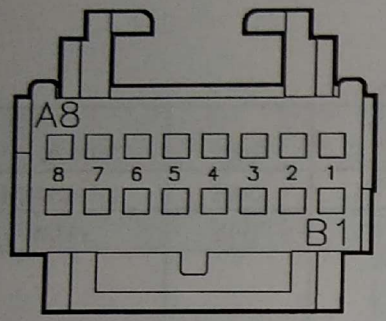
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	DK BLU	1191B	.50	RH LOW BEAM – LO
A2	ORN	40	.35	LOW NOTE HORN B+
A3	ORN	140	.35	HIGH NOTE HORN B+
A4	ORN	7K	.35	BPM RUN 1/ WAKE–UP
A5	ORN	7B	.35	COOLANT RECOV-ERY CHECK VALVE RUN 1/ WAKE–UP
A6	ORN	7C	.35	MODE VALVE RUN 1/ WAKE–UP
A7	ORN	7E	.35	OUTSIDE AIR VALVE RUN 1/WAKE–UP
A8	ORN	7H	.35	COOLING FAN BUFFER RUN 1/ WAKE–UP
A9	ORN	7G	.35	CHARGER RECEPTACLE COOLANT VALVE RUN 1/ WAKE–UP
A10	WHT	26B	.35	BPM WAKE–UP
A11	BRN/WHT	309C	.35	RF PARK LAMP – HI
A12	BRN/WHT	309B	.50	RF MARKER LAMP – HI

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
B1				
B2	WHT	2027B	.35	HTCM WAKE–UP IN
B3	WHT	2027F	.35	BPM WAKE–UP IN
B4	WHT	2027C	.35	APM WAKE–UP IN
B5				
B6	PPL	2025B	.35	LOW NOTE HORN PASS THRU
B7	PNK	2026B	.35	HIGH NOTE HORN PASS THRU
B8				
B9				
B10	TAN	800H	.35	HTCM SERIAL DATA
B11	TAN	800G	.35	BPM SERIAL DATA
B12	TAN	800K	.35	SDM SERIAL DATA

CamScanner

HARNESS CONNECTOR FACES

RIGHT HAND JUNCTION BLOCK (RHJB) (J3)



PSMELC67201AA

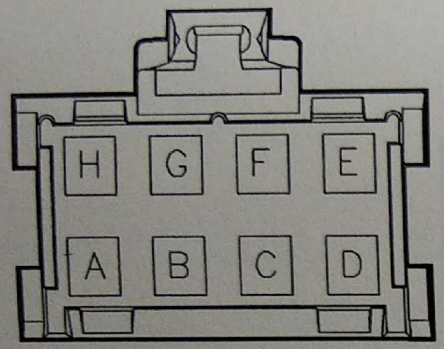
BLACK
12084944

RIGHT HAND JUNCTION BLOCK – J3 – 12084944				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A1	DK BLU	781C	.35	RH DOOR LOCK SWITCH – UNLOCK
A2	LT BLU	780C	.35	RH DOOR LOCK SWITCH – LOCK
A3	DK BLU	666	.50	RH POWER WINDOW MOTOR
A4	BRN	667	.50	RH POWER WINDOW MOTOR
A5	ORN	740	.35	RH DOOR LOCK SWITCH B+
A6	TAN	294C	.35	RH DOOR LOCK MOTOR
A7	GRA	295C	.35	RH DOOR LOCK MOTOR
A8				
B1	PPL/WHT	889B	.35	RH MIRROR HORIZON-TAL MOTOR
B2	LT GRN	200C	.35	RF SPEAKER +
B3	DK GRN	117C	.35	RF SPEAKER –
B4	BLK	350J	.35	RH DOOR JAMB SWITCH GROUND
B5	LT GRN	1495C	.35	RH DOOR JAMB SWITCH HI
B6				
B7	BRN/WHT	1498B	.35	RH MIRROR MOTOR B+
B8	RED/WHT	881B	.35	RH MIRROR VERTICAL MOTOR

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

RIGHT HAND JUNCTION BLOCK (RHJB) (J5)



PSMELC67248AA

GRAY
12110626

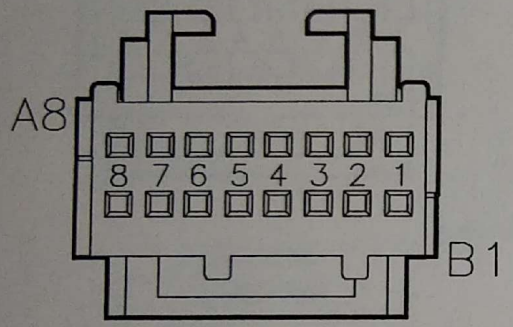
RIGHT HAND JUNCTION BLOCK – J5 – 12110626				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A	BLK	350F	1.0	FRONT END COOLING FAN BUFFER GROUND
B	RED	842	1.0	HAZ/RUN/ACC/MISC FUSE B+
C	RED	1442B	1.0	R HDLP LO FUSE B+
D				
E	BLK	350N	1.0	BLOWER MOTOR GROUND
F				
G	BLK	227C	1.0	WIPER MOTOR LO
H	DK BLU	227E	.35	WASHER PUMP LO

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

HARNESS CONNECTOR FACES

RIGHT HAND JUNCTION BLOCK (RHJB) (J6)



PSMELC67179AA

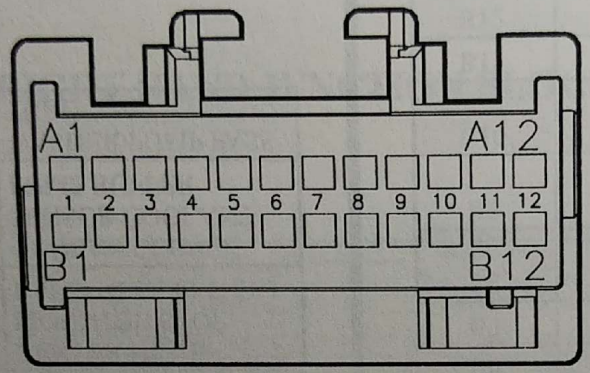
RED
12092632

RIGHT HAND JUNCTION BLOCK – J6 – 12092632				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A1	BRN	9B	.35	REAR LICENSE LAMPS HI REAR SIDE MARKER LAMPS HI REAR TAIL/STOP LAMPS HI
A2	BRN	41F	.35	DEFOGGER MODULE RUN 1
A3	ORN	1732G	.35	FOUR BAR LAMP HI
A4	ORN	1732F	.35	INSIDE REAR VIEW MIRROR
A5	ORN	1732E	.35	CARGO LAMP SWITCH HI
A6	YEL/BLK	1334B	.50	LR TURN LAMP HI
A7	DK GRN/WHT	1335B	.35	RR TURN LAMP HI
A8	ORN	1440	.35	POWER OUTLET B+
B1	LT BLU	20B	1.0	STOP LAMPS B+ PASS THRU
B2	BLK	350M	.35	INSIDE REAR VIEW MIRROR GROUND
B3	WHT	193B	.35	REAR DEFOGGER COMMAND – DEFOGGER MODULE
B4	YEL	820B	.50	CENTER HIGH MOUNTED STOP LAMP – HI
B5	WHT	108C	.35	BATT PACK FAN PASS THRU
B6	LT BLU	156B	.35	FOUR BAR LAMP LO
B7	WHT	156	.35	INSIDE REAR VIEW MIRROR LO
B8	LT GRN	24B	1.0	BACKUP LAMPS HI PASS THRU

Location: Passenger COmpartment, Under Right Side of I/P

CamScanner

RIGHT HAND JUNCTION BLOCK (RHJB) (J8)



PSMELC67180AA

PINK
12110244

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

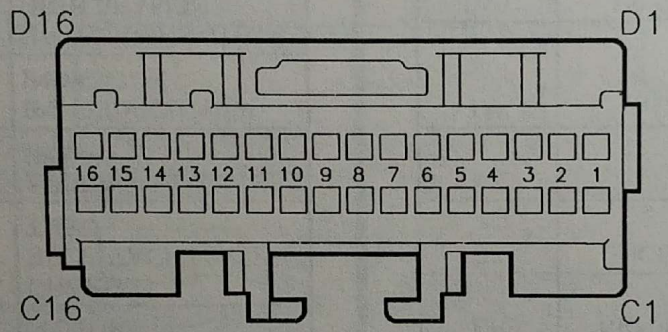
HARNESS CONNECTOR FACES

RIGHT HAND JUNCTION BLOCK – J8 – 12110244

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	BRN	9A	.35	REAR LICENSE LAMPS HI REAR SIDE MARKER LAMPS HI REAR TAIL/STOP LAMPS HI
A2	YEL/BLK	1334A	.35	LR TURN LAMPS PASS THRU
A3	LT GRN	1966A	.35	TURN/HAZ/DRL MODULE
A4	DK GRN/WHT	1335A	.35	TURN/HAZ/DRL MODULE – RH TURN IN
A5	LT BLU	20A	.80	REAR STOP LAMPS HI PASS THRU
A6	YEL	820A	.35	CENTER HIGH MOUNTED STOP LAMP HI PASS THRU
A7	ORN	7A	.35	COOLANT LEVEL SENSOR COOLANT PUMP BUFFER
A8	RED	228A	.35	WASHER PUMP PASS THRU
A9	BRN	41A	.35	LHJB RUN 1
A10	BRN	41W	.35	RSA RUN 1
A11	ORN	2040	.35	RADIO B+
A12	BRN/WHT	309A	.35	RF PARK LAMP HI
B1	DK BLU/WHT	1495E	.35	RSA DOOR AJAR SIGNAL
B2	WHT	194	.35	RSA UNLOCK COMMAND
B3	TAN	819	.35	RSA RUN 1 COMMAND
B4	LT GRN	275A	.35	PRND SWITCH PASS THRU
B5	DK GRN	117B	.35	RF SPEAKER –
B6	LT GRN	200B	.35	RF SPEAKER +
B7	DK BLU	1393	.35	RSA INT LAMPS LO
B8	ORN	248	.35	RSA RUN 2 COMMAND
B9	PPL	1697A	.35	TURN/HAZ/DRL MODULE IN
B10	LT GRN	1478A	.35	COOLANT LEVEL SENSOR PASS THRU
B11	DK GRN	1399	.35	RSA RAP COMMAND
B12	WHT	26C	.35	BATTERY RECOVERY SWITCH PASS THRU

CamScanner

RIGHT HAND JUNCTION BLOCK (J9)



PSMELC67251AA

PINK

12110245

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

HARNESS CONNECTOR FACES

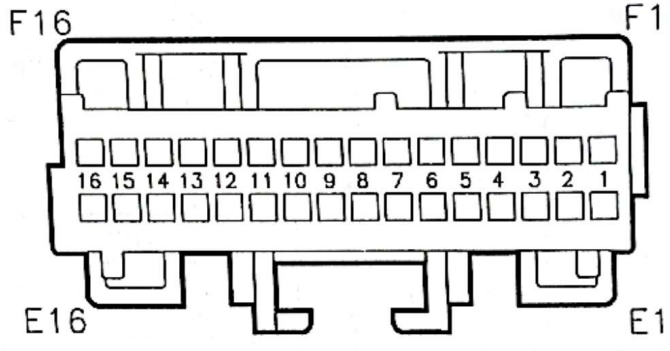
RIGHT HAND JUNCTION BLOCK – J9 – 12110245

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	DK BLU/WHT	1495A	.35	DOOR JAMB SWITCH HI
C2	TAN	167	.35	RSA RH WINDOW DOWN
C3	BLK/WHT	238A	.35	LH SEAT BELT PASS THRU
C4	BRN	241A	.35	PSCM RUN 2
C5	ORN	294A	.35	LH DOOR LOCK MOTOR
C6	GRA	295A	.35	LH DOOR LOCK MOTOR
C7	PNK	213A	.35	CHARGE RECEPTACLE PASS THRU
C8	BRN	358A	.35	AIR BAG INDICATOR IPC
C9	BRN/WHT	419A	.35	IPC SERVICE NOW INDICATOR
C10	PPL	524A	.35	HEADLAMP SWITCH HIGH BEAM IN
C11	YEL	525A	.35	HEADLAMP SWITCH LOW BEAM IN
C12	LT BLU	166	.35	RSA RH WINDOW DOWN
C13	RED/BLK	780A	.35	LH DOOR LOCK SWITCH – LOCK
C14	BLK	1051	.35	RADIO GROUND
C15	WHT	852A	.35	BTCM ABS INDICATOR
C16	WHT	2027A	.35	CHARGER RECEPTACLE

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1	WHT	2027E	.35	BATTERY RECOVERY SWITCH WAKE-UP
D2	RED	2014A	.35	COOLANT PUMP BUFFER PASS THRU
D3	YEL	234A	.35	IPC SEAT BELT INDICATOR
D4	TAN	800J	.35	IPC SERIAL DATA
D5	PPL/WHT	889A	.35	RH HORIZONTAL MIRROR MOTOR
D6	BRN/WHT	1498A	.35	RH MIRROR MOTOR HI
D7	DK BLU	1660A	.35	BTCM LOW TRAC INDICATOR
D8	PPL	1885A	.35	PCM SERVICE SOON INDICATOR
D9	RED	2018A	.35	IPC REDUCED PERFORMANCE INDICATOR
D10	LT GRN	2030A	.35	IPC TEMP IND
D11	PNK	2026A	.35	HIGH NOTE HORN PASS THRU
D12	PPL	2025A	.35	LOW NOTE HORN PASS THRU
D13	RED/WHT	881A	.35	RH VERT MIRROR MOTOR
D14	LT GRN	838A	.35	TURN/HAZ/DRL MOD
D15	PPL	1807A	.35	BPM CLASS 2
D16	ORN/BLK	781A	.35	RF LH DOOR LOCK SWITCH – UNLOCK

CamScanner

RIGHT HAND JUNCTION BLOCK (J12)



PSMELC67249AA

TAN

12110112

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

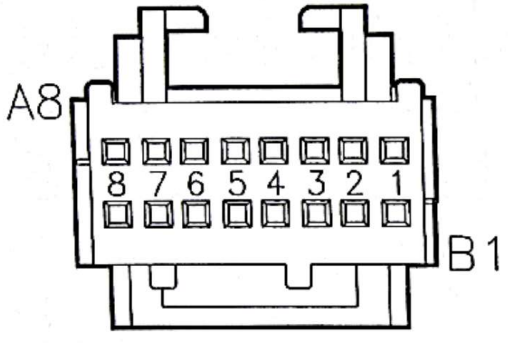
HARNESS CONNECTOR FACES

RIGHT HAND JUNCTION BLOCK – J12 – 12110112				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
E1	BLK/WHT	350H	.35	HTCM GROUND
E2	BLK	350S	.35	BPM GROUND
E3	BLK/WHT	350B	.35	HIGH NOTE HORN GROUND
E4	BLK	350A	.35	LOW NOTE HORN GROUND
E5	BLK/WHT	350G	.35	RF MARKER LAMP GROUND
E6	BLK/WHT	1751	.35	SDM GROUND
E7	BLK/WHT	350C	.50	RF PARK/TURN LAMP GROUND
E8	BLK	350E	.35	BPM GROUND
E9				
E10				
E11	BLK	552B	.35	LOW PRESSURE SENSOR GROUND
E12	BLK	552C	.35	HIGH PRESSURE SENSOR GROUND
E13	BLK/WHT	350R	.35	REVERSING VALVE GROUND
E14	BLK	350K	.35	BPM GROUND
E15	BLK/WHT	552E	.35	DISCHARGE TEMP SENSOR
E16	BLK	552F	.35	OUTSIDE TEMP SENSOR GROUND

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
F1	BLK/WHT	552G	.35	REFRIGERANT TEMP SENSOR GROUND
F2	BLK	552K	.35	COOLANT TEMP SENSOR GROUND
F3	BLK/WHT	552H	.35	COOLANT PUMP TEMP SENSOR GROUND
F4				
F5				
F6				
F7				
F8				
F9				
F10	GRA	605A	.35	HTCM +5V REF
F11	GRA/BLK	605B	.35	MODE VALVE +5V REF
F12	GRA	605C	.35	OUTSIDE AIR VALVE ACTUATOR +5V REF
F13	GRA/BLK	605E	.35	COOLANT RECOVERY CHECK VALVE +5V REF
F14	GRA / BLK	605F	.35	LOW PRESSURE SENSOR +5V REF
F15	GRA/BLK	605G	.35	HIGH PRESSURE SENSOR +5V REF
F16	GRA	605H	.35	CHARGER RECEPTACLE COOLANT VALVE +5V REF

CamScanner

RIGHT HAND JUNCTION BLOCK (J13)



PSMELC67194AA

GREEN
12110259

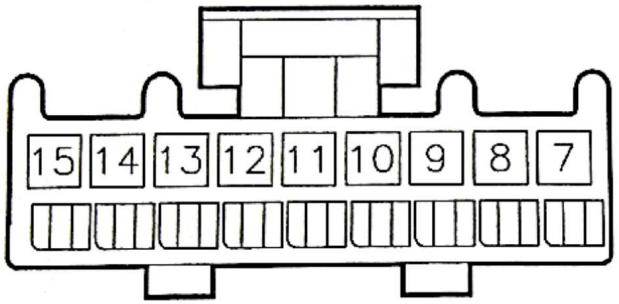
RIGHT HAND JUNCTION BLOCK – J13 – 12110259				
CAVITY	WIRE COLOR	CIRCUIT NO.	WIRE-SIZE	CIRCUIT FUNCTION
A1	BRN	41	.35	RH TT BANK RUN 1
A2				
A3	BRN	358	.35	AIR BAG INDICATOR
A4	BLK	450	.35	RH TT BANK GROUND
A5				
A6	YEL	234	.35	SEAT BELT INDICATOR
A7	RED	2018	.35	REDUCED PER-FORMANCE INDICATOR
A8				
B1	LT GRN	1660	.35	LOW TRAC INDICATOR
B2				
B3	WHT	852	.35	ANTILOCK INDICATOR
B4				
B5	BRN/WHT	419	.35	SERVICE NOW INDICA-TOR
B6	BLK/WHT	2030	.35	TEMP INDICATOR
B7	BRN	1885	.35	SERVICE SOON INDICA-TOR
B8				

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

HARNESS CONNECTOR FACES

RIGHT I/P – BODY INLINE #1 – FEMALE CONNECTOR



PSMELC67212AA

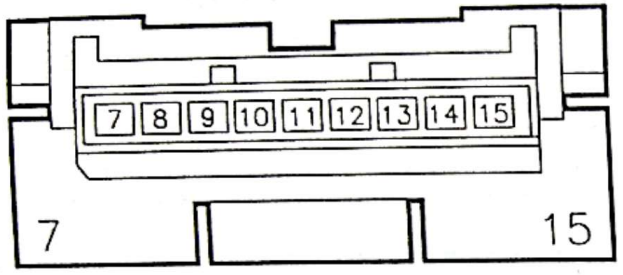
BLACK
12064980

RIGHT I/P – BODY INLINE #1 – 12064980				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
7	LT BLU / BLK	1166B	.35	KEYPAD 1/2 OUT
8	GRA / BLK	1167B	.35	KEYPAD 3/4 OUT
9	LT GRN / BLK	1168C	.35	KEYPAD 5/6 OUT
10	ORN / BLK	1169C	.35	KEYPAD 7/8 OUT
11	PNK / BLK	1170C	.35	KEYPAD 9/0 OUT
12	YEL / BLK	373C	.35	KEYPAD +5V REF
13	RED / BLK	1165C	.35	KEYPAD BACK-LIGHT
14	LT GRN	1055A	.35	CHECK TIRE PRESSURE SWITCH HI
15				

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

RIGHT I/P – BODY INLINE #1 – MALE CONNECTOR



PSMELC67225AA

BLACK
12040905

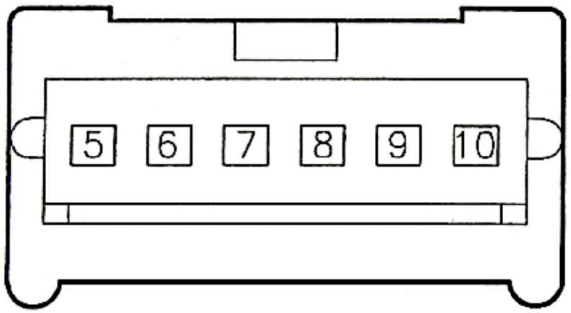
RIGHT I/P – BODY INLINE #1 – 12064980				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
7	LT BLU / BLK	1166B	.35	KEYPAD 1/2 OUT
8	GRA / BLK	1167B	.35	KEYPAD 3/4 OUT
9	LT GRN / BLK	1168C	.35	KEYPAD 5/6 OUT
10	ORN / BLK	1169C	.35	KEYPAD 7/8 OUT
11	PNK / BLK	1170C	.35	KEYPAD 9/0 OUT
12	YEL / BLK	373C	.35	KEYPAD +5V REF
13	RED / BLK	1165C	.35	KEYPAD BACK-LIGHT
14	LT GRN	1055A	.35	CHECK TIRE PRESSURE SWITCH HI
15				

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

HARNESS CONNECTOR FACES

RIGHT I/P – BODY INLINE #2 – FEMALE CONNECTOR



BLACK
12040953

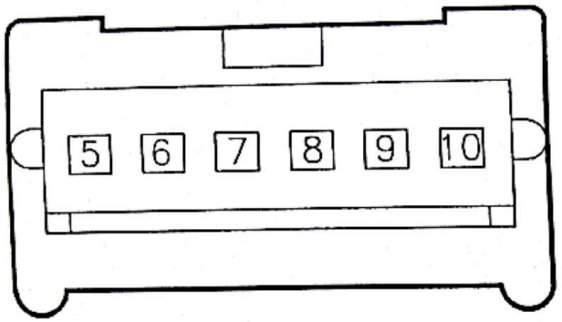
PSMELC67226AA

RIGHT I/P – BODY INLINE #2 – 12040953				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
5	BRN	199C	.35	LR SPEAKER +
6	YEL	116C	.35	LR SPEAKER –
7	LT BLU	115C	.35	RR SPEAKER –
8	DK BLU	46C	.35	RR SPEAKER +
9				
10				

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

RIGHT I/P – BODY INLINE #2 – MALE CONNECTOR



BLACK
12040952

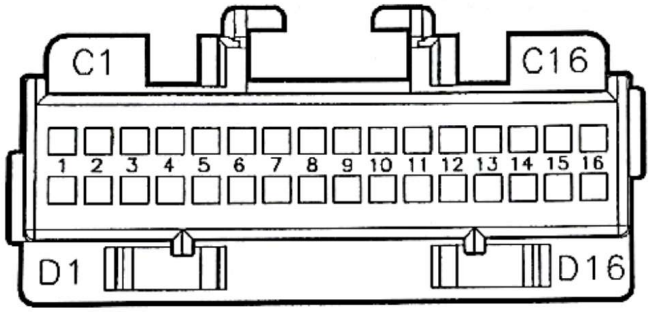
PSMELC67226AA

RIGHT I/P – BODY INLINE #2 – 12040952				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
5	BRN	199B	.35	LR SPEAKER +
6	YEL	116B	.35	LR SPEAKER –
7	LT BLU	115B	.35	RR SPEAKER –
8	DK BLU	46B	.35	RR SPEAKER +
9				
10				

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

RUN/LOCK SHIFTER ASSEMBLY (RSA)



PSMELC67247AA

BLACK
12045575

Location: Passenger Compartment, Behind RSA

CamScanner

RUN/LOCK SHIFTER ASSEMBLY (RSA) – 12045575

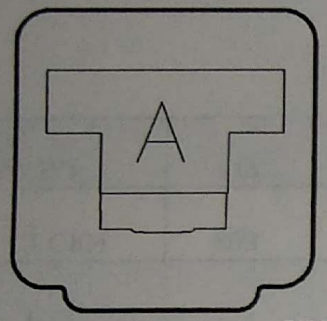
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
C1	ORN	340	.35	DIMMER B+
C2	ORN	240	.35	B+
C3	LT BLU/BLK	1166B	.35	KEYPAD 1/2 IN
C4	GRA/BLK	1167B	.35	KEYPAD 3/4 IN
C5	LT GRN/BLK	1168C	.35	KEYPAD 5/6 IN
C6	TAN	800J	.35	SERIAL DATA
C7	TAN	800N	.35	SERIAL DATA
C8	LT GRN	275C	.35	PARK SELECT IN
C9	BRN/WHT	301E	.35	PARKLAMPS ON IN
C10	RED/BLK	1165C	.35	KEYPAD BACKLIGHT
C11	PNK	314	.35	RADIO WAKE–UP IN
C12	YEL/BLK	373C	.35	KEYPAD +5V REF
C13	WHT	194	.35	DOOR UNLOCK COMMAND OUT
C14	GRA	728	.35	SECURITY INDICATOR OUT
C15	LT GRN	80B	.35	VEHICLE IN RUN/ACC OUT
C16	TAN	819	.35	RUN 1 COMMAND OUT

CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
D1	PNK/BLK	1170C	.35	KEYPAD 9/0 IN
D2	BRN/WHT	230B	.35	DIM LEVEL OUT
D3	ORN/BLK	1169C	..35	KEYPAD 7/8 IN
D4	LT GRN	1055A	.35	CHECK TIRE PRESSURE IN
D5	DK BLU/WHT	1495E	.35	DOOR AJAR IN
D6				
D7	TAN	167	.35	RH POWER WINDOW DOWN OUT
D8	LT BLU	166	.35	RH POWER WINDOW UP OUT
D9	GRA	1136	.35	LH POWER WINDOW DOWN OUT
D10	TAN	1300	.35	LH POWER WINDOW UP OUT
D11	DK BLU	1393	.35	INT LAMPS CONTROL OUT
D12	DK GRN	1399	.35	ACC COMMAND OUT
D13	ORN	248	.35	RUN 2 COMMAND OUT
D14	BRN	41W	.35	BTSI HI
D15	TAN/WHT	816C	.35	BTSI LO
D16	BLK	450M	.35	GROUND

CamScanner

HARNESS CONNECTOR FACES

SECONDARY REAR DEFOGGER



PSMELC67188AA

BLACK
12092133

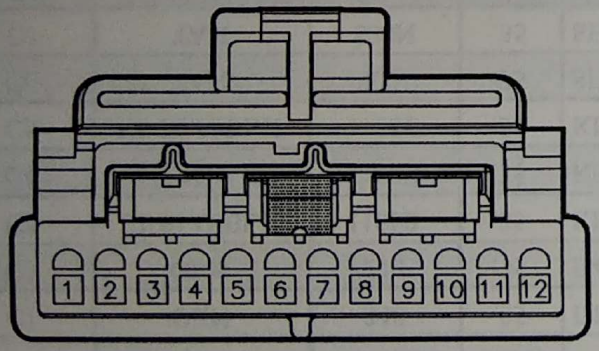
SECONDARY REAR DEFOGGER – 12092133				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	RED	1342B	3.0	SECONDARY REAR DEFOG – HIGH

Location: Left Side of Rear Back Glass

SECONDARY REAR DEFOGGER – 12092133				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	PPL	681	2.0	SECONDARY REAR DEFOG – LOW

Location: Left Side of Rear Back Glass

SENSING AND DIAGNOSTIC MODULE (SDM)



12160351
YELLOW

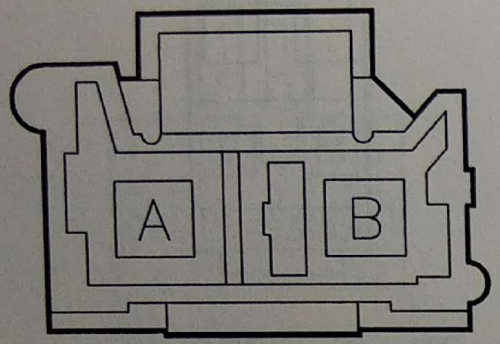
PSMELC66892AA

SENSING AND DIAGNOSTIC MODULE – 12160351				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	WHT/BLK	1403	0.50	PASSENGER HI
2	WHT	347	0.50	DRIVER HI
3	DK GRN	348	0.50	DRIVER LO
4	DK GRN/WHT	1404	0.50	PASSENGER LO
5	TAN	800K	0.35	SERIAL DATA
6	BLK/WHT	1751	0.50	GROUND
7	BRN	358E	0.35	AIR BAG IND OUT
8	BLK/WHT	238E	0.35	DRIVER SEAT BELT IN
9				
10	YEL	1139	0.35	RUN 1
11				
12				

Location: RH Side of Battery Tunnel Under Carpet.

CamScanner

SIR DRIVER INFLATOR MODULE/IP-HARNESS CONNECTOR (DISABLE)



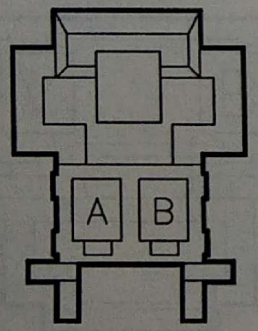
YELLOW
12092865

PSMELC66888AA

SIR DRIVER INFLATOR DISABLE/I/P HARNESS CONNECTOR (DISABLE) – 12092865				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	347	0.50	DRIVER LOOP HI
B	DK GRN	348	0.50	DRIVER LOOP LO

Location: I/P – Lower Left – Base of Steering Column

SIR DRIVER INFLATOR MODULE – COIL PIGTAIL



YELLOW
12110500

PSMELC66890AA

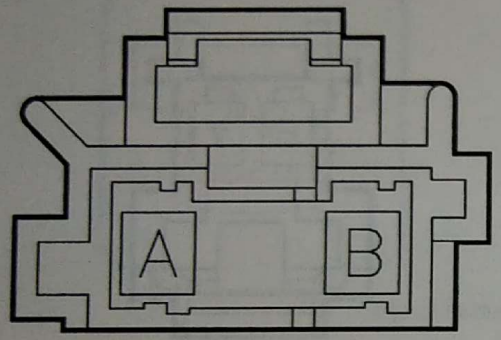
SIR DRIVER INFLATOR MODULE – COIL PIGTAIL – 12110500				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	347	0.50	DRIVER LOOP LO
B	DK GRN	348	0.50	DRIVER LOOP HI

Location: Behind Driver Inflator Module

CamScanner

HARNESS CONNECTOR FACES

SIR INFLATOR DISABLE – COIL PIGTAIL



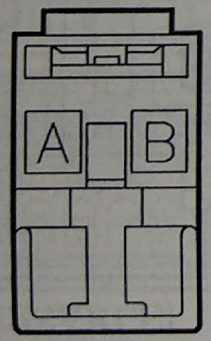
YELLOW
12092865

PSMELC66889AA

SIR INFLATOR DISABLE – COIL PIGTAIL – 12092865				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	347	0.50	DRIVER HI
B	DK GRN	348	0.50	DRIVER LO

Location: Passenger Compartment, Under Left Side of I/P – Near Base of Steering Column

SIR PASSENGER INFLATOR MODULE PIGTAIL



12077921

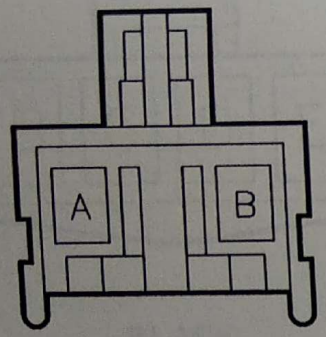
PSMELC66933AA

SIR PASSENGER INFLATOR MODULE PIGTAIL – 12077921				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK GRN/WHT	1403	0.50	PASSENGER HI
B	WHT/BLK	1404	0.50	PASSENGER LO

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

SIR PASSENGER INFLATOR MODULE/IP – HARNESS CONNECTOR (DISABLE)



YELLOW
12110288

PSMELC66887AA

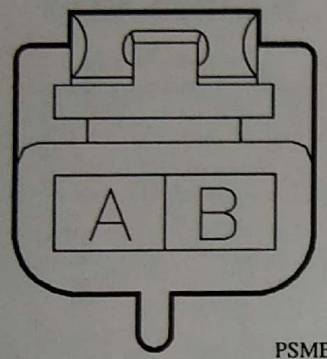
SIR PASSENGER INFLATOR MODULE/I/P HARNESS CONNECTOR (DISABLE) – 12110288				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT/BLK	1403	0.50	PASSENGER HI
B	DK GRN	1404	0.50	PASSENGER LO

Location: Passenger Compartment, Under Right Side of I/P

CamScanner

HARNESS CONNECTOR FACES

SPEAKERS – FRONT/REAR



PSMELC68106AB

BLACK
12052832

LEFT FRONT SPEAKER – 12052832				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	GRA	118C	.35	SPEAKER –
B	TAN	201C	.35	SPEAKER +

Location: Left Door

RIGHT FRONT SPEAKER – 12052832				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK GRN	117C	.35	SPEAKER –
B	LT GRN	200C	.35	SPEAKER +

Location: Right Door

LEFT REAR SPEAKER – 12052832				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	YEL	116C	.35	SPEAKER –
B	BRN	199C	.35	SPEAKER +

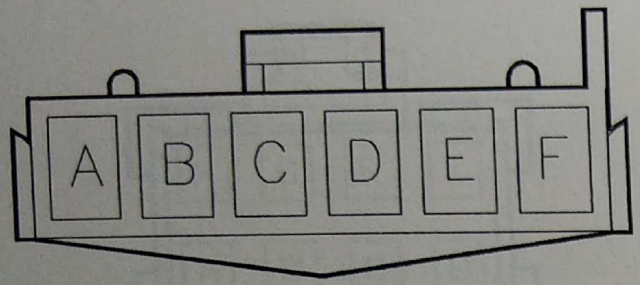
Location: Rear Package Shelf

RIGHT REAR SPEAKER – 12052832				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	115C	.35	SPEAKER –
B	DK BLU	46C	.35	SPEAKER +

Location: Rear Package Shelf

CamScanner

STOPLAMP SWITCH



BLACK
12040551

PSMELC67258AA

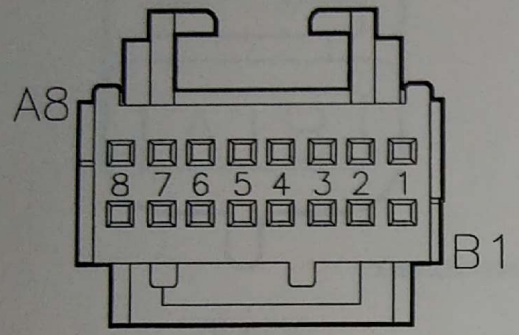
STOPLAMP SWITCH – 12040551				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	WHT	17	1.0	B+ OUT TO STOP LAMPS
B	RED	142B	1.0	B+
C	BRN	41R	.80	RUN 1
D	BRN	86B	.80	BRAKE SWITCH OUT TO PCM
E				
F				

Location: Passenger Compartment, Under Left Side of I/P – Near Brake Pedal

CamScanner

HARNESS CONNECTOR FACES

TRUNK JUNCTION BLOCK (J1)



PSMELC67194AA

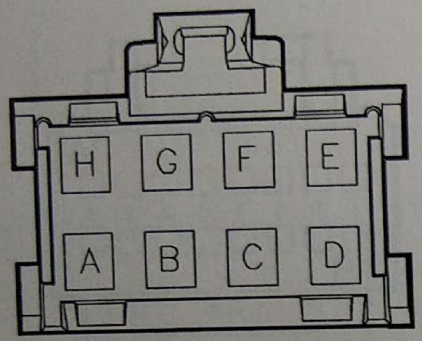
GREEN
12110259

TRUNK JUNCTION BLOCK – J1 – 12110259				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	LT GRN	24B	1.0	BACKUP LAMPS HI PASS THRU
A2	LT BLU	20B	1.0	STOP LAMPS HI PASS THRU
A3	BRN	9B	.35	LR LAMPS PTC B+ RR LAMPS PTC B+
A4	BRN	41F	.35	DEFOG MODULE RUN 1
A5	DK BLU	809E	.35	LR LICENSE LAMP HI
A6	DK GRN	1335B	.35	RR TURN LAMP HI PASS THRU
A7	WHT	609E	.35	RR LICENSE LAMP HI
A8	YEL	1334B	.50	LR TURN LAMP HI PASS THRU
B1	BLK	150H	.35	CARGO LAMP GROUND
B2	WHT	193B	.35	REAR DEFOG COMMAND TO DEFOG MODULE
B3	BLK	150B	.50	CENTER HIGH MOUNTED STOP LAMP GROUND
B4	BLK	150C	.35	LR LICENSE LAMP GROUND
B5	BLK	150F	.35	EXTERNAL KEYPAD GROUND
B6	BLK	150J	.35	CIGAR LIGHTER GROUND
B7	BLK	150T	.35	CHECK TIRE PRESSURE SWITCH GROUND
B8	BLK	150E	.35	RR LICENSE LAMP GROUND

Location: Right Side of Trunk Compartment, Under Carpet

CamScanner

TRUNK JUNCTION BLOCK (J2)



PSMELC67248AA

GRAY
12110626

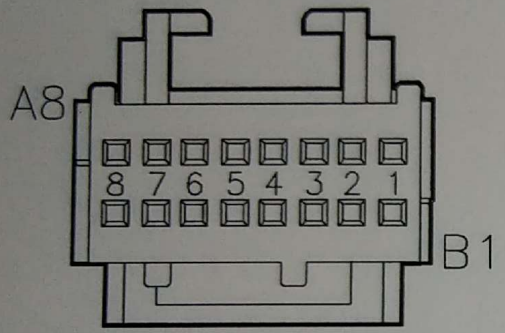
TRUNK JUNCTION BLOCK – J2 – 12110626				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				
B				
C				
D	BLK	150L	1.0	BATTERY PACK FAN GROUND
E				
F				
G	LT BLU	292	2.0	PRIMARY REAR DEFOG LO – OUT FROM DEFOG MODULE
H	PPL	681	2.0	SECONDARY REAR DEGOG LO – OUT FROM DEFOG MODULE

Location: Right Side of Trunk Compartment, Under Carpet

CamScanner

HARNESS CONNECTOR FACES

TRUNK JUNCTION BLOCK (J3)



GREEN
12110259

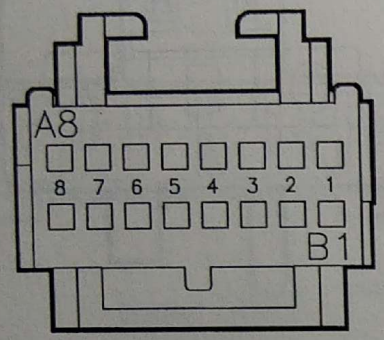
PSMELC67194AA

TRUNK JUNCTION BLOCK – J3 – 12110259				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	DK GRN/WHT	1335F	.50	RR TURN LAMP HI
A2	LT BLU	20G	.50	RR STOP LAMP HI
A3	WHT	609C	.35	RR MARKER LAMP HI
A4	WHT	609B	.50	RR TAIL LAMP HI
A5				
A6				
A7	BLK	150P	.35	RR MARKER LAMP GROUND
A8	BLK	150S	.50	RR TAIL/STOP LAMP GROUND
B1	LT GRN	24F	.50	RH BACKUP LAMP HI
B2				
B3				
B4				
B5				
B6				
B7	BLK	150R	.50	RR TURN LAMP GROUND
B8	BLK	150G	.50	RR BACKUP LAMP GROUND

Location: Right Side of Trunk Compartment, Under Carpet

CamScanner

TRUNK JUNCTION BLOCK (J4)



PSMELC67201AA

BLACK
12084944

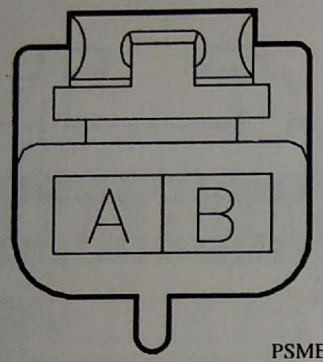
TRUNK JUNCTION BLOCK – J4 – 12084944				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A1	YEL/BLK	1334F	.50	LR TURN LAMP HI
A2	LT BLU	20H	.50	LR STOP LAMP HI
A3	DK BLU	809B	.50	LR TAIL LAMP HI
A4	DK BLU	809C	.35	LR MARKER LAMP HI
A5				
A6				
A7	BLK	150PP	.35	LR MARKER LAMP GROUND
A8	BLK	150RR	.50	LR TURN LAMP GROUND
B1	LT GRN	24G	.50	LR BACKUP LAMP HI
B2				
B3				
B4				
B5				
B6				
B7	BLK	150SS	.50	LR TAIL/STOP LAMP GROUND
B8	BLK	150GG	.50	LR BACKUP LAMP GROUND

Location: Right Side of Trunk Compartment, Under Carpet

CamScanner

HARNESS CONNECTOR FACES

TRUNK LAMP



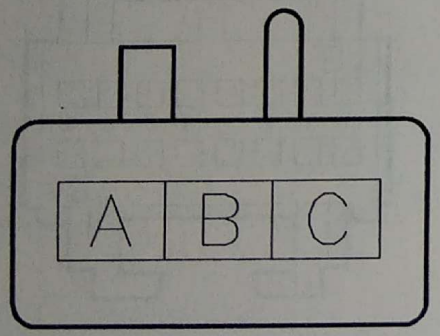
PSMELC68106AB

BLACK
12052832

TRUNK LAMP – 12052832				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	150H	.35	GROUND
B	ORN/BLK	737	.35	FROM TRUNK LAMP SWITCH

Location: Trunk Compartment, Center of Package Shelf Near Center High Mounted Stop Lamp/CHMSL

TRUNK LAMP SWITCH



PSMELC67186AA

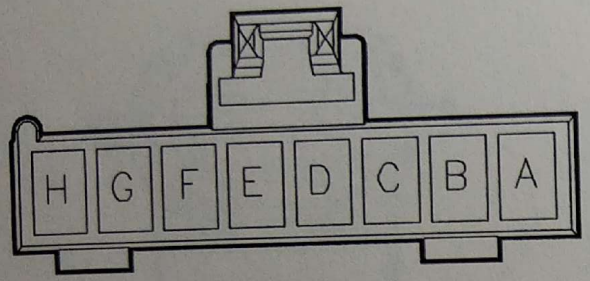
BLACK
12047781

TRUNK LAMP SWITCH – 12047781				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	ORN/BLK	737	.35	SWITCH HI
B	ORN	1732E	.35	TO TRUNK LAMP
C				

Location: Trunk Compartment, Part of Latch Assembly

CamScanner

TURN/HAZARD SWITCH



PSMELC67261AA

DARK GRAY
12092237

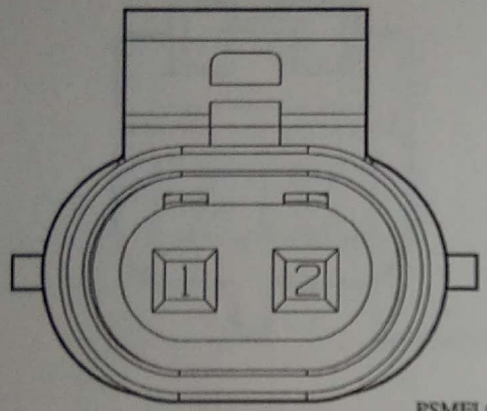
TURN/HAZARD SWITCH – 12092237				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				
B	DK BLU/WHT	1415	.35	RIGHT TURN OUT
C	LT BLU/WHT	1414	.35	LEFT TURN OUT
D	ORN	640H	.35	HAZARD SWITCH B+
E	BRN	41G	.35	TURN SWITCH RUN 1
F				
G				
H	BLK	28	.35	HORN OUT

Location: Passenger Comartment, Attached to Steering Column

CamScanner

HARNESS CONNECTOR FACES

WASHER PUMP



PSMELC66038AA

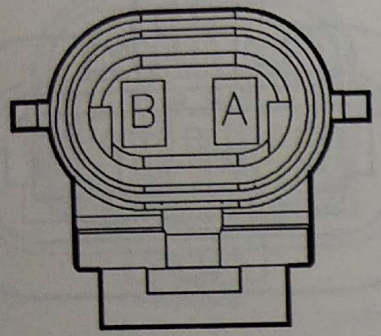
12177127

WASHER PUMP – 12177127				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
1	RED	228B	.35	WASHER PUMP HI
2	DK BLU	227E	.35	WASHER PUMP LO

Location: Underhood, in Washer Fluid Bottle

CamScanner

WHEEL SPEED SENSORS



LIGHT GRAY
12052644

PSMELC67178AA

WHEEL SPEED SENSOR – LEFT FRONT – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	LT BLU	830	.50	WSS HI
B	YEL	873	.50	WSS LO

Location: At Left Front Wheel Bearing

WHEEL SPEED SENSOR – RIGHT FRONT – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK GRN	872	.50	WSS HI
B	TAN	833	.50	WSS LO

Location: At Right Front Wheel Bearing

WHEEL SPEED SENSOR – LEFT REAR – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	884C	.80	WSS HI
B	RED	885C	.80	WSS LO

Location: At Left Rear Wheel Bearing

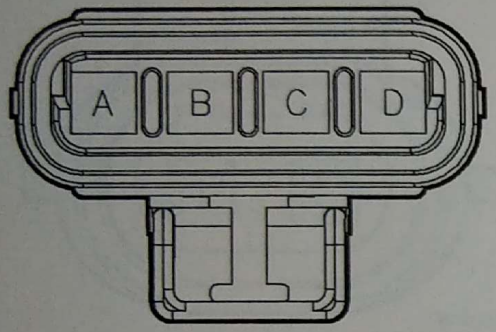
WHEEL SPEED SENSOR – RIGHT REAR – 12052644				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	882C	.80	WSS HI
B	WHT	883C	.80	WSS LO

Location: At Right Rear Wheel Bearing

CamScanner

HARNESS CONNECTOR FACES

WINDSHIELD WIPER/WASHER (WSW) INLINE – FEMALE CONNECTOR



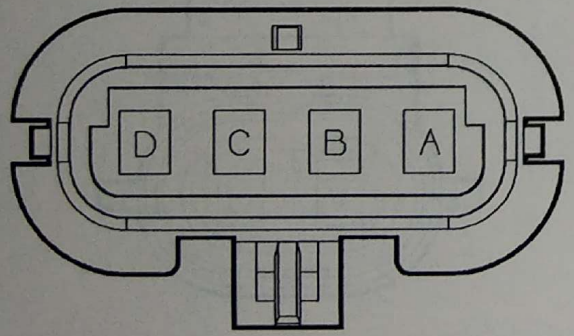
DARK GRAY
12129565

PSMELC67176AA

WINDSHIELD WIPER/WASHER INLINE – 12129565				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BRN	227B	1.0	WIPER/WASHER LO
B	BLK	407E	.35	RF BRAKE PRESSURE SENSOR GROUND
C	LT BLU / BLK	416E	.35	RF BRAKE PRESSURE SENSOR OUT
D	LT BLU	2036B	.35	RF BRAKE PRESSURE SENSOR OUT

Location: Underhood, Left Side Front of Dash

WINDSHIELD WIPER/WASHER (WSW) INLINE – MALE CONNECTOR



PSMELC67219AA

DARK GRAY
12129600

WINDSHIELD WIPER/WASHER INLINE – 12129600				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	BLK	227C	1.0	WIPER/WASHER LO
B	BLK	407G	.35	RF BRAKE PRESSURE SENSOR GROUND
C	GRA	416G	.35	RF BRAKE PRESSURE SENSOR OUT
D	LT BLU	2036C	.35	RF BRAKE PRESSURE SENSOR OUT

Location: Underhood, Left Side of Dash

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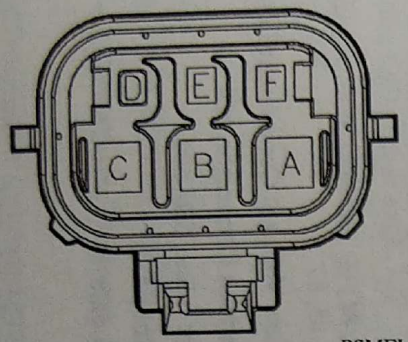
WIPER MOTOR



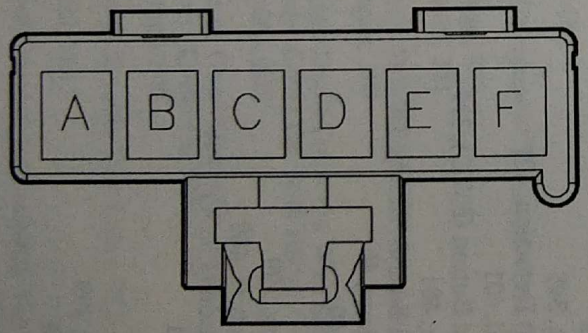
PSMELC67177AA

BLACK
12129126

WIPER MOTOR – 12129126				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A	DK BLU	227B	1.0	WIPER MOTOR LO
B	RED	42B	1.0	B+
C	PPL	92	1.0	WIPER/WASHER SWITCH (HI) IN
D	DK GRN	113	.35	WIPER/WASHER REQUEST IN
E	GRA	112	1.0	WIPER DELAY IN

Location: Plenum, Right Side Under Leaf Screen

WIPER/WASHER SWITCH



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12092254

WIPER/WASHER SWITCH – 12092254				
CAVITY	WIRE COLOR	CIRCUIT NUMBER	WIRE SIZE	CIRCUIT FUNCTION
A				
B	GRA	112	1.0	WIPER DELAY OUT
C	DK GRN	113	.35	WIPER/WASHER REQUEST OUT
D	PPL	92	1.0	WIPER/WASHER SWITCH (HI) OUT
E	RED	228C	1.0	WASHER SWITCH OUT
F	RED	42A	1.0	B+

Location: Passenger Compartment, Attached to Steering Column

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Service Manual Contents

- Trouble Shooting
- Power Distribution
- Diagnostic Flow Charts
- Diagnostic Trouble Codes

NOTE: Refer to the Index in the back of this manual or the Table of Contents in the front of this manual for location of specific component.

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